MINERALS YEARBOOK

1957

Volume II of Three Volumes

FUELS

U. S. DEPARTMENT OF THE INTERIOR
March 3, 1849

Prepared by the staff of the

BUREAU OF MINES

DIVISION OF PETROLEUM
DIVISION OF BITUMINOUS COAL
DIVISION OF ANTHRACITE

UNITED STATES DEPARTMENT OF THE INTERIOR

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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1959

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. – Price, $2.25 cloth

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FOREWORD

Minerals Yearbook, 1957, published in three volumes, provides a record of performance of the Nation's mineral industries during the year, with enough background information to interpret the year's developments.

Volume I includes chapters on metal and nonmetal mineral commodities, with the exception of the mineral fuels. Included also are a chapter reviewing these mineral industries, a statistical summary, and chapters on mining technology, metallurigcal technology, and employment and injuries. An additional chapter in the 1957 volume I compares Bureau of Mines mineral-commodity production data for 1954 with those presented in the 1954 Census of Mineral Industries reports published by the United States Department of Commerce.

Volume II includes chapters on each mineral fuel, an employment and injuries presentation, and a mineral-fuels review chapter that summarizes developments in the fuel industries and incorporates all data previously published in the Statistical Summary chapter. Also now included in this review chapter are data on energy production and uses that have previously been included in the Bituminous Coal chapter.

Volume III is comprised of chapters covering each of the 48 States, plus chapters on the Territory of Alaska, the Territory of Hawaii and island possessions in the Pacific Ocean, and the Commonwealth of Puerto Rico and island possessions in the Caribbean Sea, including the Canal Zone. Volume III also has a Statistical Summary chapter, identical with that in volume I, and another presenting employment and injury data.

The data in the Minerals Yearbook are based largely upon information supplied by mineral producers, processors, and users, and acknowledgment is made of this indispensable cooperation given by industry. Information obtained from individuals by means of confidential surveys has been grouped to provide statistical aggregates. Data on individual producers are presented only if available from published or other nonconfidential sources, or when permission of the individuals concerned has been granted.

Marling J. Ankeny, *Director*

ACKNOWLEDGMENTS

The chapters in this volume of the Minerals Yearbook were prepared by the staffs of the Division of Anthracite, the Division of Bituminous Coal, and the Division of Petroleum of the Bureau of Mines, and the final printed volume was prepared under editorial supervision by Virgil L. Barr, assistant to the chief, Division of Petroleum, and Thelma Stewart, editorial assistant.

Those chapters dealing with bituminous coal and its products were prepared under the general supervision of T. Reed Scollon, chief, Division of Bituminous Coal, and T. W. Hunter, chief, Branch of Bituminous-Coal Economics and Statistics; the chapters on petroleum and related commodities were prepared under the general supervision of R. A. Cattell, chief, Division of Petroleum, and D. S. Colby, chief, Branch of Petroleum Economics; the anthracite chapter was prepared under the general direction of Joseph A. Corgan, chief, Division of Anthracite; the helium chapter was prepared under the direction of C. W. Seibel, Assistant Director—Helium Activities, and Henry P. Wheeler, Jr., chief, Helium Liaison Office; and data for the Pacific coast were compiled under the direction of E. T. Knudsen, Region II.

Because of the many sources of data presented, it is impossible to give credit to each source individually, but acknowledgment is here made of the ready and willing cooperation of producers and users of fuels who supplied data and of the business press, trade associations, scientific journals, international organizations, and State and Federal agencies. The United States Department of Commerce, Bureau of the Census, furnished data on foreign trade, and the Department of State, United States Foreign Service, provided information on foreign production and developments.

The mining and geology and related departments of the respective States have been most cooperative and have made available supplementary and verifying information with respect to production and plant operations. For their assistance the Bureau is deeply grateful, and acknowledgment is made to the following State organizations that assisted with the canvasses of bituminous coal and lignite:

Alabama: Division of Safety and Inspection, Birmingham.
Alaska: Territorial Department of Mines, Juneau.
Arizona: State mine inspector, Phoenix.
Arkansas: State mine inspector, Fort Smith.
Colorado: Colorado Coal Mine Inspection Department, Denver.
Georgia: Department of Mines, Mining, and Geology, State Division of Conservation, Atlanta.
Illinois: State Department of Mines and Minerals, Springfield.
Indiana: Bureau of Mines, Terre Haute.
Iowa: State mine inspectors, Des Moines.
Kansas: State Mine Inspection Division, Pittsburg.
Kentucky: Kentucky Department of Mines and Minerals, Lexington.
Maryland: Maryland Bureau of Mines, Westernport.

Missouri: Division of Mine Inspection, Jefferson City.
New Mexico: State inspector of mines, Albuquerque.
North Dakota: State coal-mine inspector, Bismarck.
Ohio: Division of Mines and Mining, Ohio Department of Industrial Relations, Columbus.
Oklahoma: Chief mine inspector, Oklahoma City.
Pennsylvania: Pennsylvania Department of Mines and Mineral Industries, Harrisburg.
Tennessee: Tennessee Division of Mines, Knoxville.
Utah: Safety Division, Industrial Commission of Utah, Salt Lake City.
Virginia: Division of Mines, Virginia Department of Labor and Industry, Big Stone Gap.
Washington: Chief coal-mine inspector, Department of Labor and Industries, Seattle.
West Virginia: West Virginia Department of Mines, Charleston.
Wyoming: State coal-mine inspector, Rock Springs.

Appreciation is also expressed to the Commonwealth of Pennsylvania Department of Mines and Mineral Industries, Harrisburg, and Commonwealth of Massachusetts, Division on Necessaries of Life, Boston, for assistance in acquiring data on anthracite and to the following for their assistance with the peat canvass:

Michigan: Department of Conservation, Lansing.
New Jersey: Department of Conservation and Economic Development, Bureau of Geology and Topography, Trenton.
Washington: Department of Conservation and Development, Olympia.

Credit is also due the following State organizations that assisted with the petroleum and natural-gas canvasses:

Arkansas: Arkansas Oil and Gas Commission, El Dorado.
California: California Department of Natural Resources, San Francisco. Public Utilities Commission, State of California, San Francisco.
Illinois: Oil and Gas Division, and State Geological Survey Division, Urbana.
Kansas: State Geological Survey, Lawrence.
Maryland: Department of Geology, Mines, and Water Resources, Baltimore.
Michigan: Geological Survey Division, Department of Conservation, Lansing.
Missouri: Division of Geological Survey and Water Resources, Department of Business and Administration, Rolla.
New York: New York State Science Service, Albany.
North Dakota: North Dakota Geological Survey, Grand Forks.
Ohio: Oil and Gas Section, Department of Natural Resources, Columbus.
Tennessee: Division of Geology, Department of Conservation, Nashville.
Virginia: Geological Survey Division, Department of Conservation and Development, Charlottesville.
West Virginia: Geological and Economic Survey, Morgantown.

Grateful acknowledgment is made to the American Iron and Steel Institute, New York City; the Anthracite Institute, Wilkes-Barre, Pa.; the Association of American Railroads, Washington, D. C.; the Maher Coal Bureau, St. Paul, Minn.; the Ore and Coal Exchange, Cleveland, Ohio; the National Association of Packaged Fuel Manufacturers, Topeka, Kans.; and the many other trade and industry associations that have provided data.

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PART I. GENERAL REVIEWS

Review of the Mineral-Fuel Industries in 1957

By William A. Vogely and T. W. Hunter

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GENERAL SUMMARY

CONTRACTION of the economy and the aftermath of the Suez Canal closing were major factors that affected the mineral-fuels industry in 1957. The general decline in business activity in the latter half of the year is reflected in lower consumption and production in some sectors of the mineral fuels and slowing rates of increase in others. The total production of energy increased slightly—0.76 percent—and the total consumption of energy was virtually unchanged; both deviated downward from the historical trend of a high rate of growth. The slowing of consumption was reflected in increased physical stocks of mineral fuels, as production rates were not reduced proportionally. At year end stocks were very high and were a depressing factor in the outlook for 1958; however, prices rose during 1957, so the value of production continued to climb.

Employment in all fuel mining averaged higher than in 1956 but fell during the last few months of the year. Average hourly earnings continued their upward movement, but weekly hours declined in response to the slowing of business activity. Internal freight rates for coal also rose, but ocean freight rates fell as the year progressed and the unusual demand for bottoms occasioned by the Suez crisis tapered off. The index of major cost items increased for anthracite, bituminous coal, and petroleum, but the relative labor cost per dollar of product in bituminous coal was below that of last year and lower than in 1949.

Export markets for coal held up well during the year, owing in part to stockpiling in response to uncertainties associated with the Suez Canal closing. Petroleum imports, which had ceased to be a problem during the Suez crisis, were made subject to voluntary import controls during the latter half of 1957.

The first project under the cooperative anthracite mine-water-control program was completed in 1957.

DOMESTIC PRODUCTION

Changes in the domestic production of fuels and energy may be measured in several ways. Table 1 summarizes the total energy production from mineral fuels and waterpower in the United States in terms of British thermal unit (B. t. u.) content of the various sources. The values of mineral-fuels production are summarized in table 2; and the actual physical volume of production, in the usual physical units used for each commodity, with value, are given in table 3. Finally, indexes of physical volume of production, weighted by values, are listed in tables 4 and 5. Since these measures are directed to different aspects of the fuels industries, it is not surprising that these measures sometimes move disparately. Such was the case in 1957. Total energy production, measured in British thermal units, was slightly higher than in 1956—up 0.76 percent. The actual physical amount of production showed 5 increases and 6 decreases, while the value of mineral-fuel production increased almost 1 billion dollars because of unit-value increases in all important categories. The indexes of physical volume of production show the same pattern as

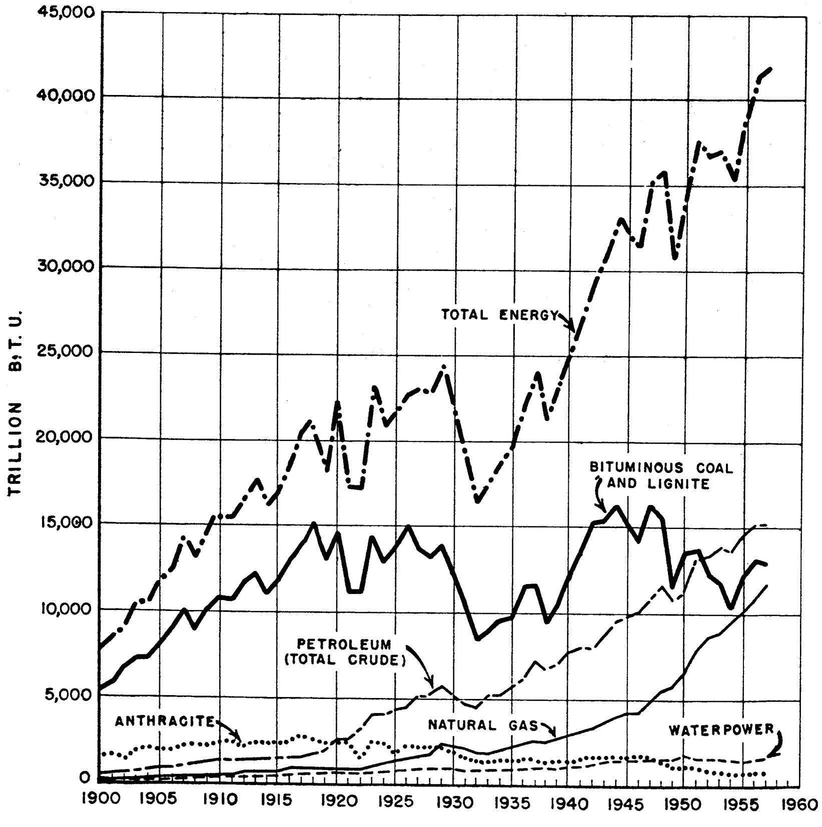

FIGURE 1.—Production of mineral-energy fuels and energy from waterpower in continental United States, 1900–57.

the energy table. Taken together, these measures reflect the important variation in the various aspects of the mineral-fuels industries.

Total Energy.—The total production of energy from mineral fuels and waterpower in the United States in 1957—41,826 trillion B. t. u.—reached a new alltime high (0.76 percent over 1956 and 19 percent over 1947). As indicated in table 1 and figure 2, however, all the gain was attributable to increases in the production of energy from natural gas and waterpower, since the production of bituminous coal and anthracite dropped 1.6 and 12 percent, respectively, below 1956, and the production of crude oil remained approximately the same. The slight rise in energy production was accomplished in spite of almost no change in energy consumption—the gain was at the expense of energy imports—and also reflected the continued high coal exports.

Value of Production.—Mineral-fuels production increased in value in 1957—the only group to increase. The rise in value was due almost entirely to unit-value increases, although natural gas, which represents almost 10 percent of the total value, showed advances in both volume and net value. The fuels value reached an alltime high (in current dollars) in 1957.

Domestic Production.—Production of the important mineral fuels except natural gas declined in 1957. There were production increases in gilsonite, helium, LP-gases, and peat, as well as in natural gas. The decrease in coal—2.7 percent—was less than that in consumption, because of continued increases in overseas exports, occasioned to a considerable extent by stockpiling in response to the uncertainty regarding the Suez Canal.

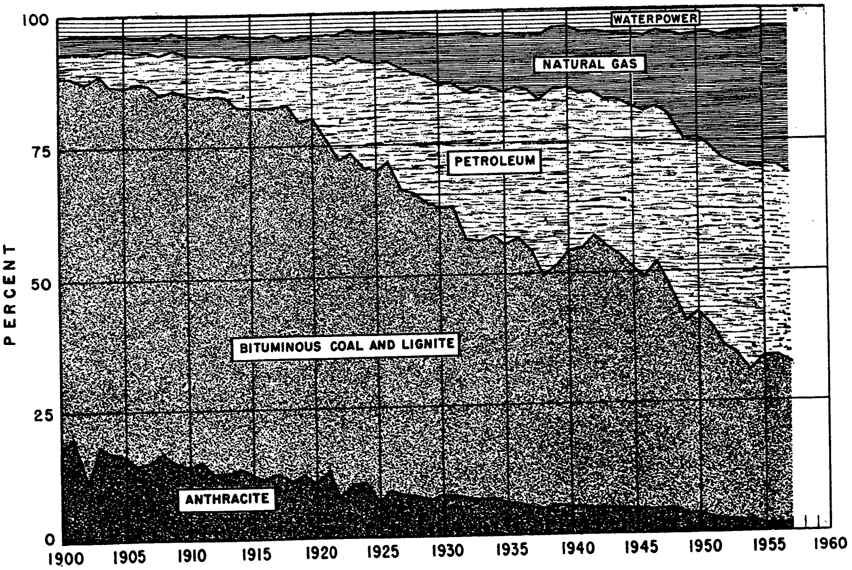

FIGURE 2.—Percentage of total production of British thermal units equivalent of mineral-energy fuels and energy from waterpower in continental United States, 1900–57.

TABLE 1.—Production of mineral-energy fuels and energy from waterpower, in trillion B. t. u., and percentage countributed by each in continental United States [1]

Year	Bituminous coal and lignite			Anthracite	Crude petroleum	Natural gas, wet	Waterpower	Grand total	Percentage					
	Continental United States	Alaska	Total United States						Bituminous coal and lignite	Anthracite	Crude petroleum	Natural gas, wet	Waterpower	Total
1900	5, 563	----------	5, 563	1, 457	369	254	250	7, 893	70. 5	18. 4	4. 7	3. 2	3. 2	100. 0
1901	5, 917	----------	5, 917	1, 714	402	283	264	8, 580	68. 9	20. 0	4. 7	3. 3	3. 1	100. 0
1902	6, 818	----------	6, 818	1, 051	515	301	289	8, 974	76. 0	11. 7	5. 7	3. 4	3. 2	100. 0
1903	7, 408	----------	7, 408	1, 895	583	319	321	10, 526	70. 4	18. 0	5. 5	3. 0	3. 1	100. 0
1904	7, 301	----------	7, 301	1, 858	679	333	354	10, 525	69. 4	17. 6	6. 4	3. 2	3. 4	100. 0
1905	8, 255	----------	8, 255	1, 973	781	377	386	11, 772	70. 1	16. 8	6. 6	3. 2	3. 3	100. 0
1906	8, 983	----------	8, 983	1, 811	734	418	414	12, 360	72. 7	14. 7	5. 9	3. 4	3. 3	100. 0
1907	10, 343	----------	10, 343	2, 174	963	437	441	14, 358	72. 0	15. 1	6. 7	3. 1	3. 1	100. 0
1908	8, 713	----------	8, 713	2, 115	1, 035	432	476	12, 771	68. 2	16. 6	8. 1	3. 4	3. 7	100. 0
1909	9, 949	----------	9, 949	2, 059	1, 062	517	513	14, 100	70. 6	14. 6	7. 5	3. 7	3. 6	100. 0
1910	10, 928	----------	10, 928	2, 146	1, 215	547	539	15, 375	71. 1	14. 0	7. 9	3. 5	3. 5	100. 0
1911	10, 635	----------	10, 635	2, 298	1, 279	551	565	15, 328	69. 4	15. 0	8. 3	3. 6	3. 7	100. 0
1912	11, 793	----------	11, 793	2, 143	1, 293	604	585	16, 418	71. 8	13. 0	7. 9	3. 7	3. 6	100. 0
1913	12, 535	----------	12, 535	2, 325	1, 441	626	609	17, 536	71. 5	13. 2	8. 2	3. 6	3. 5	100. 0
1914	11, 075	----------	11, 075	2, 307	1, 541	636	636	16, 195	68. 4	14. 3	9. 5	3. 9	3. 9	100. 0
1915	11, 597	----------	11, 597	2, 260	1, 630	676	659	16, 822	69. 0	13. 4	9. 7	4. 0	3. 9	100. 0
1916	13, 166	----------	13, 166	2, 224	1, 744	810	681	18, 625	70. 7	11. 9	9. 4	4. 3	3. 7	100. 0
1917	14, 456	1	14, 457	2, 530	1, 945	855	700	20, 487	70. 6	12. 3	9. 5	4. 2	3. 4	100. 0
1918	15, 178	2	15, 180	2, 510	2, 064	775	701	21, 230	71. 5	11. 8	9. 7	3. 7	3. 3	100. 0
1919	12, 204	2	12, 206	2, 238	2, 195	802	718	18, 159	67. 2	12. 3	12. 1	4. 4	4. 0	100. 0
1920	14, 897	2	14, 899	2, 276	2, 569	883	738	21, 365	69. 7	10. 7	12. 0	4. 1	3. 5	100. 0
1921	10, 895	2	10, 897	2, 298	2, 739	732	620	17, 286	63. 0	13. 3	15. 9	4. 2	3. 6	100. 0
1922	11, 061	2	11, 063	1, 389	3, 234	843	643	17, 172	64. 5	8. 1	18. 8	4. 9	3. 7	100. 0
1923	14, 788	4	14, 792	2, 371	4, 248	1, 113	685	23, 209	63. 7	10. 2	18. 3	4. 8	3. 0	100. 0
1924	12, 670	2	12, 672	2, 233	4, 141	1, 263	648	20, 957	60. 5	10. 6	19. 8	6. 0	3. 1	100. 0
1925	13, 623	2	13, 625	1, 570	4, 430	1, 314	668	21, 607	63. 1	7. 2	20. 5	6. 1	3. 1	100. 0
1926	15, 019	1	15, 020	2, 145	4, 471	1, 452	728	23, 816	63. 1	9. 0	18. 8	6. 1	3. 0	100. 0
1927	13, 563	2	13, 565	2, 034	5, 227	1, 598	776	23, 200	58. 5	8. 8	22. 5	6. 9	3. 3	100. 0
1928	13, 116	4	13, 120	1, 914	5, 229	1, 734	854	22, 851	57. 4	8. 4	22. 9	7. 6	3. 7	100. 0
1929	14, 014	3	14, 017	1, 875	5, 842	2, 118	816	24, 668	56. 8	7. 6	23. 7	8. 6	3. 3	100. 0

1930	12,246	3	12,249	1,762	5,208	2,148	752	22,119	55.4	8.0	23.5	9.7	3.4	100.0
1931	10,008	3	10,011	1,515	4,936	1,869	668	18,999	52.7	8.0	26.0	9.8	3.5	100.0
1932	8,112	2	8,114	1,266	4,554	1,729	713	16,376	49.5	7.7	27.8	10.6	4.4	100.0
1933	8,739	2	8,741	1,258	5,253	1,733	711	17,696	49.4	7.1	29.7	9.8	4.0	100.0
1934	9,413	2	9,415	1,452	5,267	1,970	698	18,802	50.1	7.7	28.0	10.5	3.7	100.0
1935	9,753	3	9,756	1,325	5,780	2,136	806	19,803	49.2	6.7	29.2	10.8	4.1	100.0
1936	11,501	3	11,504	1,386	6,378	2,411	812	22,491	51.2	6.1	28.4	10.7	3.6	100.0
1937	11,669	4	11,673	1,317	7,419	2,684	871	23,964	48.7	5.5	31.0	11.2	3.6	100.0
1938	9,128	4	9,132	1,171	7,043	2,565	866	20,777	44.0	5.6	33.9	12.3	4.2	100.0
1939	10,341	4	10,345	1,308	7,337	2,763	838	22,591	45.8	5.8	32.5	12.2	3.7	100.0
1940	12,068	4	12,072	1,308	7,849	2,979	880	25,088	48.1	5.2	31.3	11.9	3.5	100.0
1941	13,464	7	13,471	1,432	8,133	3,162	934	27,132	49.6	5.3	30.0	11.7	3.4	100.0
1942	15,260	7	15,267	1,532	8,043	3,436	1,136	29,414	51.9	5.2	27.3	11.7	3.9	100.0
1943	15,455	8	15,463	1,540	8,733	3,839	1,304	30,879	50.1	5.0	28.3	12.4	4.2	100.0
1944	16,224	9	16,233	1,618	9,732	4,176	1,344	33,103	49.0	4.9	29.4	12.6	4.1	100.0
1945	15,126	8	15,134	1,395	9,939	4,423	1,442	32,333	46.8	4.3	30.7	13.7	4.5	100.0
1946	13,979	10	13,989	1,537	10,057	4,550	1,406	31,539	44.3	4.9	31.9	14.4	4.5	100.0
1947	16,513	9	16,522	1,453	10,771	5,012	1,426	35,184	47.0	4.1	30.6	14.2	4.1	100.0
1948	15,697	10	15,707	1,451	11,717	5,615	1,481	35,971	43.7	4.0	32.6	15.6	4.1	100.0
1949	11,461	11	11,472	1,085	10,683	5,911	1,539	30,690	37.4	3.5	34.8	19.3	5.0	100.0
1950	13,517	10	13,527	1,120	11,449	6,841	1,573	34,510	39.2	3.2	33.2	19.8	4.6	100.0
1951	13,969	13	13,982	1,084	13,037	8,106	1,559	37,768	37.0	2.9	34.5	21.5	4.1	100.0
1952	12,213	18	12,231	1,031	13,282	8,705	1,581	36,830	33.2	2.8	36.1	23.6	4.3	100.0
1953	11,958	23	11,981	786	13,671	9,116	1,522	37,076	32.3	2.1	36.9	24.6	4.1	100.0
1954	10,245	17	10,262	739	13,427	9,488	1,449	35,365	29.0	2.1	38.0	26.8	4.1	100.0
1955	12,157	17	12,174	665	14,410	10,204	1,447	38,900	31.3	1.7	37.1	26.2	3.7	100.0
1956	13,104	19	13,123	734	15,181	10,930	1,542	41,510	31.6	1.8	36.6	26.3	3.7	100.0
1957	12,887	22	12,909	644	15,178	11,571	1,524	41,826	30.9	1.5	36.3	27.7	3.6	100.0

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[1] The unit heat values employed are: Anthracite, 12,700 B. t. u. per pound; bituminous coal and lignite, 13,100 B. t. u. per pound; petroleum, 5,800,000 B. t. u. per barrel; natural gas, total production x 1,075 B. t. u. minus repressuring vent and waste gas x 1,035. Waterpower includes installations owned by manufacturing plants and mines, as well as Government and privately owned public utilities. The fuel equivalent of waterpower is calculated from the kilowatt-hours of power produced wherever available, as is true of all public-utility plants since 1919. Otherwise, the fuel equivalent is calculated from the reported horsepower of installed water wheels, assuming a capacity factor of 20 percent for factories and mines and 40 percent for public utilities.

TABLE 2.—Value of mineral production in continental United States, 1925–57, by mineral groups [1]

(Million dollars)

Year	Mineral fuels	Nonmetallic minerals (except fuels)	Metals	Total
1925	2,910	1,187	715	4,812
1926	3,371	1,219	721	5,311
1927	2,875	1,201	622	4,698
1928	2,666	1,163	655	4,484
1929	2,940	1,166	802	4,908
1930	2,500	973	507	3,980
1931	1,620	671	287	2,578
1932	1,460	412	128	2,000
1933	1,413	432	205	2,050
1934	1,947	520	277	2,744
1935	2,013	564	365	2,942
1936	2,405	685	516	3,606
1937	2,798	711	756	4,265
1938	2,436	622	460	3,518
1939	2,423	754	631	3,808
1940	2,662	784	752	4,198
1941	3,228	989	890	5,107
1942	3,568	1,056	999	5,623
1943	4,028	916	987	5,931
1944	4,574	836	900	6,310
1945	4,569	888	774	6,231
1946	5,090	1,243	729	7,062
1947	7,188	1,338	1,084	9,610
1948	9,502	1,552	1,219	12,273
1949	7,920	1,559	1,101	10,058
1950	8,689	1,822	1,351	11,862
1951	9,779	2,079	1,671	13,529
1952	9,616	2,163	1,617	13,396
1953 [2]	10,257	2,350	1,811	14,418
1954 [2]	9,919	[3] 2,630	1,518	14,067
1955 [2]	10,780	[3] 2,972	2,055	15,807
1956 [2]	11,741	[3] 3,284	2,358	17,383
1957 [2]	12,720	[3] 3,277	2,129	18,126

[1] Data for 1925–46 are not strictly comparable with those for subsequent years since for the earlier years the value of heavy clay products has not been replaced by the value of raw clays used for such products.

[2] Includes Alaska and Hawaii.

[3] Total has been adjusted to eliminate duplicating value of clays and stone.

TABLE 3.—Mineral-fuels production in continental United States, 1954–57, by individual fuels

Mineral	1954		1955	
	Quantity	Value (thousand dollars)	Quantity	Value (thousand dollars)
Asphalt and related bitumens (native):				
Bituminous limestone and sandstone ... short tons	1,337,822	3,686	1,427,207	4,111
Gilsonite ... do	75,943	2,724	82,822	3,117
Carbon dioxide, natural (estimated) thousand cubic feet	638,900	211	702,417	234
Coal:				
Bituminous [1] ... thousand short tons	391,706	1,769,620	464,633	2,092,383
Lignite ... do				
Pennsylvania anthracite ... do	29,083	247,870	26,205	206,097
Helium (shipments) ... thousand cubic feet	189,873	3,202	235,868	3,881
Natural gas ... million cubic feet	8,742,546	882,501	9,405,351	978,357
Natural-gas liquids:				
Natural gasoline and cycle products thousand gallons	5,385,282	402,418	5,844,904	423,775
LP-gases ... do	5,204,304	178,994	5,972,698	195,231
Peat ... short tons	244,163	2,258	273,669	2,283
Petroleum (crude) ... thousand barrels	2,314,988	6,424,930	2,484,428	6,870,380
Total mineral fuels	-----------	9,918,000	-----------	10,780,000
Total all other minerals	-----------	4,148,000	-----------	5,027,000
Grand total, mineral production	-----------	14,066,000	-----------	15,807,000

See footnotes at end of table.

TABLE 3.—Mineral-fuels production in continental United States, 1954–57, by individual fuels—Continued

Mineral	1956		1957	
	Quantity	Value (thousand dollars)	Quantity	Value (thousand dollars)
Asphalt and related bitumens (native):				
Bituminous limestone and sandstone......short tons..	1,458,533	4,114	1,168,507	3,221
Gilsonite......do....	89,003	3,822	206,041	4,259
Carbon dioxide, natural (estimated) thousand cubic feet..	713,030	235	704,276	139
Coal:				
Bituminous [1]......thousand short tons..	500,874	2,412,004	492,704	[4] 2,508,314
Lignite......do....				
Pennsylvania anthracite......do....	28,900	236,785	25,338	227,754
Helium (shipments)......thousand cubic feet..	266,937	4,413	310,365	5,112
Natural gas......million cubic feet..	10,081,923	1,083,812	[3] 10,604,130	[3] 1,212,408
Natural-gas liquids:				
Natural gasoline and cycle products thousand gallons..	5,807,100	431,958	5,734,307	415,791
LP-gases......do....	6,487,413	265,185	6,655,282	263,665
Peat......short tons..	272,972	[2] 2,320	316,217	3,458
Petroleum (crude)......thousand barrels..	2,617,283	[2] 7,296,760	[3] 2,616,778	[3] 8,079,504
Total mineral fuels......	......	[2] 11,741,000	......	12,720,000
Total all other minerals......	......	[2] 5,642,000	......	5,406,000
Grand total, mineral production......	......	[2] 17,383,000	......	18,126,000

[1] Includes small quantity of anthracite mined in States other than Pennsylvania; includes Alaska.
[2] Revised.
[3] Preliminary.
[4] Final figure.

Indexes of Physical Production.—The Bureau of Mines index of the physical volume of mineral production in the United States is a comprehensive one that uses shifting weights to reflect the changing patterns of production and consumption as the economy grows and changes. The components of the fuels group are published here for the first time; indexes for all other groups for 1880–1956 were published in Minerals Yearbook 1956, volume I (pp. 2–5). This index reflects the slowing of the economy in 1957. The growth in all groups from the 1954 lows was reversed or nearly stopped in 1957. Fuels production was virtually stable, while production by other groups increased slightly. Within the fuels group coal fell 2.6 points, while petroleum, natural gas, and natural gasoline rose very slightly—0.8 point.

The Federal Reserve Board indexes of production exhibit behavior parallel to that of the Bureau of Mines index but are available monthly. These indexes (seasonally adjusted) indicate that the slump in production began in mid-1957 for coal and in October for crude oil and natural gas, accelerating toward the end of the year in both categories.

TABLE 4.—Indexes of physical volume of mineral production in the United States, 1925–57, by groups and subgroups [1]

(1947–49=100)

Year	All minerals	Fuels			Metals	Non-metals
		Total	Coal	Petroleum, natural gas, and natural gasoline [2]		
1925	60.5	57.2	96.6	38.4	93.1	53.4
1926	65.7	63.0	112.0	39.7	96.7	56.6
1927	66.8	64.6	102.5	46.3	91.2	59.6
1928	66.6	63.9	98.4	47.1	93.5	60.0
1929	72.5	69.9	102.9	53.7	103.0	62.9
1930	64.4	63.2	91.4	48.8	80.3	56.7
1931	54.3	55.7	75.7	45.1	54.6	44.2
1932	43.8	48.5	61.8	41.3	31.0	30.3
1933	48.2	53.1	65.1	46.4	35.4	32.0
1934	52.0	55.8	71.4	47.1	44.9	36.8
1935	55.9	58.9	71.7	51.6	57.3	38.5
1936	66.2	66.1	82.4	57.0	78.7	54.5
1937	73.8	72.2	82.5	66.0	102.8	58.0
1938	63.8	64.6	66.2	63.0	70.2	52.5
1939	70.8	69.3	74.8	65.7	90.2	61.1
1940	78.4	75.6	84.6	70.1	110.0	66.2
1941	86.1	80.5	94.1	72.6	124.8	81.3
1942	90.8	84.2	105.5	72.3	135.3	86.2
1943	92.5	88.9	106.9	78.3	136.4	75.9
1944	95.4	96.3	112.5	86.8	117.7	69.9
1945	92.0	94.8	103.7	89.3	95.2	70.2
1946	91.0	93.5	98.7	90.4	78.9	83.6
1947	101.9	102.8	112.8	96.8	101.6	95.6
1948	105.9	106.5	108.0	105.5	104.4	103.4
1949	92.1	90.7	79.2	97.6	94.1	101.0
1950	102.6	100.1	91.7	105.1	108.8	116.1
1951	112.6	110.1	93.6	119.9	117.2	127.3
1952	110.9	107.8	82.7	122.8	112.7	132.1
1953	112.6	108.8	78.8	126.6	119.1	135.2
1954	107.9	104.0	68.1	125.4	97.6	146.4
1955	119.0	113.8	78.7	134.6	115.0	161.0
1956	125.8	120.5	85.0	141.7	117.2	172.4
1957 [3]	125.9	120.1	82.4	142.5	118.8	175.3

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[1] For general description of index, see Minerals Yearbook 1956, vol. I, Review of the Mineral Industries chapter, pp. 2–5. In that chapter and the corresponding 1957 chapter separate indexes are shown for various components of the metals and nonmetals indexes. However, indexes for components of the fuels index are published for the first time here. As carried back to 1925, each fuels component series was constructed by linking 3 overlapping segments of indexes computed with 3 different sets of weights: 1923–25, 1935–39, and 1947–49. The splicing period for the first 2 segments was 1930–32, while that for the second and third segments was 1943–45. Changes in the relative importance of the various fuels are indicated by the following tabulation, which shows, for each of the weight periods, the percentage of the value of production of each fuel to all minerals:

	Percent of total		
	1923–25	1935–39 [1]	1947–49
Fuels:			
Coal:			
Pennsylvania anthracite	11.01	6.19	4.09
Bituminous and lignite	30.50	22.89	25.66
Total, coal	41.51	29.08	29.75
Petroleum, etc.:			
Natural gas	2.80	3.72	3.15
Natural gasoline	2.41	2.70	2.12
Petroleum (crude)	27.61	38.98	44.63
Total, other	32.82	45.40	49.90
Total, fuels	74.33	74.48	79.65
Metals	13.87	13.26	9.57
Nonmetals	11.80	12.26	10.78
Total, all minerals	100.00	100.00	100.00

[1] Reflects revision of "Fuels" and "All minerals" indexes to allow for a new natural-gas production series.

[2] Does not cover isopentane, LP-gases, and other natural-gas liquids.

[3] Preliminary figures.

TABLE 5.—Indexes of industrial production, mineral fuels, 1953–57 annual and 1957 monthly, seasonally adjusted [1]

(1947–49=100)

Year and month	Total mineral fuels	Coal	Crude oil and natural gas	Total industrial production
1953	115	78	133	134
1954	113	67	134	125
1955	123	80	143	139
1956	129	85	150	143
1957	128	83	150	143
January	131	81	154	145
February	132	87	154	146
March	132	92	151	145
April	131	87	151	144
May	130	83	153	144
June	127	86	146	145
July	127	84	148	145
August	128	84	149	145
September	129	82	151	144
October	128	80	150	142
November	123	77	145	139
December	122	71	146	135

[1] Federal Reserve Bulletin, monthly issues.

CONSUMPTION

Consumption of mineral fuels is measured in both British thermal unit content and in the physical units usual for the commodity concerned. Both measures indicate declines for all mineral fuels except natural gas in 1957.

Calculated Energy Consumption.—Total energy consumption, expressed in British thermal units, remained virtually unchanged in 1957. Increases in natural gas, natural-gas liquids, and waterpower offset declines in other mineral fuels; the largest decrease was in bituminous coal and lignite. Consumption of energy is historically closely correlated with changes in gross national product, and the leveling off in 1957 reflects the lowering of growth in gross national product during the year. The share of total energy consumption furnished by coal decreased, reflecting continued losses to competing fuels, while the share contributed by natural gas and natural-gas liquids reached an alltime high.

Consumption Patterns.—All mineral fuels except natural gas declined in apparent consumption in 1957. Anthracite dropped sharply—13.3 percent—and bituminous coal somewhat less—4.4 percent—contrasted with the increases of both in 1956 over 1955. Crude-oil runs to stills were virtually the same as in 1956, but natural-gas consumption increased almost 6 percent. Coke consumption increased, and domestic demand for all oils also rose (probably reflecting accumulations of stock rather than actual increases in consumption).

Most groups (except electric power utilities and coke plants) reported decreased consumption of bituminous coal and lignite. The very low figure for Class I railroads (down almost one-third from 1956 and only 8 percent of the total of 10 years ago) indicates their virtual dieselization. The figures in table 8 are revised because new benchmarks have been established. A complete description of the revision

TABLE 6.—Calculated consumption of energy fuels and energy from waterpower in trillion B. t. u., and percentage contrubuted by each in continental United States [1]

Year	Bituminous coal and lignite	Anthracite	Crude oil	Petroleum products net: E, exported; I, imported	Natural gas (dry)	Natural-gas liquids	Waterpower	Grand total	Percentage							
									Bituminous coal and lignite	Anthracite	Crude oil	Petroleum products net: E, exported; I, imported	Natural gas (dry)	Natural-gas liquids	Waterpower	Total
1920	13,325	2,179	3,027	E 393	827	42	775	19,782	67.4	11.0	15.3	E 2.0	4.2	0.2	3.9	100.0
1921	10,266	2,082	3,016	E 342	682	50	656	16,410	62.6	12.7	18.4	E 2.1	4.1	.3	4.0	100.0
1922	11,185	1,443	3,390	E 319	785	56	675	17,215	65.0	8.4	19.7	E 1.9	4.6	.3	3.9	100.0
1923	13,598	2,208	4,419	E 389	1,032	90	727	21,685	62.7	10.2	20.4	E 1.8	4.8	.4	3.3	100.0
1924	12,681	2,050	4,228	E 464	1,170	103	685	20,453	62.0	10.0	20.7	E 2.3	5.7	.5	3.4	100.0
1925	13,079	1,627	4,641	E 485	1,212	124	701	20,899	62.6	7.8	22.2	E 2.3	5.8	.6	3.3	100.0
1926	13,954	1,961	4,876	E 545	1,335	149	765	22,495	62.0	8.7	21.7	E 2.4	5.9	.7	3.4	100.0
1927	13,095	1,897	5,027	E 650	1,465	179	815	21,828	60.0	8.7	23.0	E 3.0	6.7	.8	3.8	100.0
1928	13,069	1,871	5,474	E 711	1,588	200	890	22,381	58.4	8.4	24.4	E 3.2	7.1	.9	4.0	100.0
1929	13,612	1,815	5,894	E 600	1,942	246	847	23,756	57.3	7.6	24.8	E 2.5	8.2	1.0	3.6	100.0
1930	11,921	1,718	6,148	E 496	1,969	243	785	22,288	53.5	7.7	27.6	E 2.2	8.8	1.1	3.5	100.0
1931	9,743	1,484	5,304	E 339	1,715	200	692	18,799	51.8	7.9	28.2	E 1.8	9.1	1.1	3.7	100.0
1932	8,041	1,283	4,830	E 240	1,594	158	726	16,392	49.1	7.8	29.5	E 1.5	9.7	1.0	4.4	100.0
1933	8,323	1,260	5,143	E 299	1,600	144	729	16,900	49.2	7.5	30.4	E 1.8	9.5	.9	4.3	100.0
1934	9,008	1,410	5,136	E 318	1,819	161	721	17,937	50.2	7.9	28.6	E 1.8	10.2	.9	4.0	100.0
1935	9,336	1,298	5,799	E 300	1,974	169	831	19,107	48.9	6.8	30.4	E 1.6	10.3	.9	4.3	100.0
1936	10,697	1,351	6,426	E 302	2,221	184	841	21,418	49.9	6.3	30.0	E 1.4	10.4	.9	3.9	100.0
1937	11,286	1,280	7,004	E 400	2,468	208	905	22,751	49.6	5.6	30.8	E 1.7	10.8	.9	4.0	100.0
1938	8,811	1,148	6,921	E 456	2,348	209	899	19,880	44.3	5.8	34.8	E 2.3	11.8	1.1	4.5	100.0
1939	9,854	1,262	7,327	E 486	2,539	221	872	21,589	45.6	5.9	33.9	E 2.2	11.8	1.0	4.0	100.0
1940	11,290	1,245	7,662	E 175	2,726	243	917	23,908	47.2	5.2	32.1	E .7	11.4	1.0	3.8	100.0
1941	12,893	1,338	8,343	E 139	2,851	364	975	26,625	48.4	5.0	31.3	E .5	10.7	1.4	3.7	100.0
1942	14,149	1,435	7,987	E 320	3,102	367	1,177	27,897	50.7	5.2	28.6	E 1.1	11.1	1.3	4.2	100.0
1943	15,557	1,450	8,538	E 310	3,481	379	1,347	30,442	51.1	4.8	28.1	E 1.0	11.4	1.2	4.4	100.0
1944	15,447	1,509	9,923	E 662	3,775	442	1,387	31,821	48.5	4.7	31.2	E 2.1	11.9	1.4	4.4	100.0
1945	14,661	1,311	10,199	E 580	3,973	491	1,486	31,541	46.5	4.2	32.3	E 1.8	12.6	1.5	4.7	100.0
1946	13,110	1,369	10,270	E 283	4,089	493	1,446	30,494	43.0	4.5	33.7	E .9	13.4	1.6	4.7	100.0
1947	14,302	1,224	11,065	E 262	4,518	564	1,459	32,870	43.5	3.7	33.7	E .8	13.8	1.7	4.4	100.0
1948	13,622	1,275	12,085	E 147	5,033	619	1,507	33,994	40.1	3.8	35.5	E .4	14.8	1.8	4.4	100.0
1949	11,673	958	11,402	I 57	5,289	660	1,565	31,604	36.9	3.0	36.1	I .2	16.7	2.1	5.0	100.0

1950	11,900	1,013	12,304	I 402	6,150	783	1,601	34,153	34.8	3.0	36.0	I 1.2	18.0	2.3	4.7	100.0
1951	12,285	940	13,867	I 107	7,248	874	1,592	36,913	33.3	2.5	37.6	I .3	19.6	2.4	4.3	100.0
1952	10,971	897	14,248	I 132	7,760	954	1,614	36,576	30.0	2.4	39.0	I .4	21.2	2.6	4.4	100.0
1953	11,182	711	14,912	I 180	8,156	1,006	1,550	37,697	29.7	1.9	39.5	I .5	21.6	2.7	4.1	100.0
1954	9,512	683	14,830	I 260	8,554	1,042	1,479	36,360	26.2	1.9	40.8	I .7	23.5	2.8	4.1	100.0
1955	11,104	599	15,956	I 372	9,232	1,196	1,497	39,956	27.8	1.5	39.9	I .9	23.1	3.0	3.8	100.0
1956	11,338	610	16,994	I 424	9,834	1,209	1,598	42,007	27.0	1.4	40.5	I 1.0	23.4	2.9	3.8	100.0
1957	10,838	528	16,960	I 368	10,416	1,242	1,568	41,920	25.8	1.3	40.5	I .9	24.8	3.0	3.7	100.0

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[1] The heat values employed, are: Anthracite, 12,700 B. t. u. per pound; bituminous coal and lignite, 13,100 B. t. u. per pound; crude oil, 5,800,000 B. t. u. per barrel; petroleum products, weighted average of British thermal units by using 5,248,000 gasoline, 5,670,000 kerosine, 5,825,000 distillate, 6,287,000 residual, 6,064,800 lubricants, 5,537,280 wax, 6,636,000 asphalt, and 5,796,000 miscellaneous; natural gas (dry) 1,035 B. t. u. per cubic foot; natural-gas liquids weighted average British thermal units based on production; natural gasoline 110,000 B. t. u. per gallon, and LP-gas 95,500 B. t. u. per gallon. Waterpower converted to coal equivalent at the prevailing rate of pounds of coal per kilowatt-hour each year at central electric stations.

can be found in Bureau of Mines Weekly Coal Report 2113, March 14, 1958.

TABLE 7.—Apparent consumption of mineral fuels and related products, 1956–57

Commodity	1956	1957	Change from 1956 (percent)
Fuels:			
Bituminous coal...million net tons..	432.9	413.7	−4.4
Crude petroleum, runs to stills...million barrels..	2,905.1	2,890.4	−.5
Natural gas...billion cubic feet..	9,706.9	10,279.8	+5.9
Anthracite...million net tons..	24.0	20.8	−13.3
Products:			
All oils, domestic demand [1]...million barrels..	3,213.2	3,218.3	+.2
Coke...million net tons..	73.3	74.4	+1.5
Petroleum asphalt...do....	16.6	16.3	−1.8

[1] Domestic demand will vary from consumption because of substantial secondary and consumers' stocks that are not reported to the Bureau of Mines.

TABLE 8.—Consumption of bituminous coal and lignite in the United States, 1956–57, by major consumer groups

(Thousand net tons)

Year	Electric power utilities [1]	Class I railroads [2]	Coke plants	Steel and rolling mills	Cement mills	Other industries	Retail deliveries	Bunker, foreign and Lake vessel [3]	Total
1956.......	154,983	12,308	105,913	7,189	9,026	93,302	48,667	1,470	432,858
1957.......	157,398	8,401	108,020	6,938	8,633	87,202	35,712	1,364	413,668

[1] Federal Power Commission.
[2] Association of American Railroads.
[3] Bureau of Census, U. S. Department of Commerce.

Sales of fuel oil and natural gas by consumer groups changed only slightly in 1957 as compared with 1956. Most significant is the continued increase of natural-gas consumption for space heating and cooking.

The space-heating and household market consumes the greater part of the anthracite used in the United States. Anthracite em-

TABLE 9.—Sales of fuel oil and natural gas in the United States, 1956–57, by major consumer groups

(Fuel oils—thousand barrels; natural gas—million cubic feet)

Year	Railroads	Vessels	Gas and electric power-plants	Smelters, mines, and manufactures	Space heating and cooking	Military	Oil-company fuel	Miscellaneous	Total
Distillate fuel oil:									
1956...........	89,439	18,487	5,403	44,949	377,262	11,326	10,131	58,778	615,775
1957...........	88,315	20,420	5,296	43,532	377,044	12,737	10,419	59,512	617,275
Residual fuel oil:									
1956...........	10,575	117,445	73,962	177,807	87,601	30,546	53,271	10,331	561,538
1957...........	6,953	123,651	75,950	166,885	81,412	28,962	50,153	9,984	543,950
Natural gas:									
1956...........	--------	--------	[1] 1,239,311	4,319,952	3,044,435	--------	2,099,893	-------	9,464,280
1957...........	--------	--------	[1] 1,338,079	4,611,272	3,276,185	--------	2,158,530	-------	10,045,987

[1] Memorandum entry, not additive; includes gas other than natural. Natural-gas component included under "Smelters, mines, and manufactures."

ployed for these purposes continued to decline in 1957, however, owing to the lower demand for space heating occasioned by the generally warmer weather and to continued losses to competing fuels. Consumption for electric power production—the largest industrial use of anthracite—increased 2 percent in 1957 and represented 16 percent of the total consumption in this country.

STOCKS

Physical Stocks.—The physical stocks of all items of mineral fuels were higher at the end of 1957 than at the end of 1956. These increases in stocks explain the higher production totals for the year than were justified by current consumption and indicate the inventory accumulation that normally marks a downturn in the economy. The stocks were generally higher than those during the recession of 1953–54. When related to yearly consumption, stocks at the end of 1957 were for bituminous and lignite, 21 percent; anthracite, 2 percent; crude petroleum, 10 percent; and natural gas, 2 percent.

TABLE 10.—**Physical stocks of crude mineral fuels and products at end of year, 1953–57**

(Producers' stocks, unless otherwise indicated)

Mineral	1957	1956	1955	1954	1953
Coal and related products:					
Coal—bituminous and lignite [1] net tons	85, 503, 119	82, 888, 617	72, 561, 387	73, 533, 436	85, 364, 546
Coal—Pennsylvania anthracite do	499, 620	341, 505	719, 569	1, 292, 922	1, 915, 919
Coke do	3, 148, 776	2, 334, 441	1, 700, 771	2, 948, 840	2, 679, 708
Petroleum and related products:					
Carbon black thousand pounds	349, 399	347, 574	236, 924	321, 385	410, 284
Crude petroleum and petroleum products thousand barrels	841, 317	780, 391	714, 859	714, 933	725, 507
Crude petroleum do	281, 813	266, 014	265, 610	258, 385	274, 445
Natural-gas liquids do	21, 567	20, 559	13, 564	14, 038	10, 428
Gasoline do	196, 776	187, 271	165, 433	155, 400	157, 872
Distillate fuel oil do	149, 449	133, 981	111, 333	108, 144	111, 741
Residual fuel oil do	59, 959	44, 491	39, 174	52, 105	49, 370
Petroleum asphalt do	10, 463	9, 150	7, 768	7, 175	7, 314
Other refined products do	121, 290	118, 925	111, 977	119, 686	114, 337
Natural gas [2] million cubic feet	191, 396	136, 470	67, 934	102, 106	158, 036

[1] Stocks at industrial consumers and retail yards and on upper Lake docks.
[2] Net stores at end of year.

LABOR AND PRODUCTIVITY

Employment.—The Bureau of Mines publishes two sets of employment figures for bituminous-coal mines. One set (presented in the next chapter of this volume) is unadjusted, for lack of coverage, but is directly comparable to the reported injuries and is used for calculating injury rates. These data are adjusted for coverage, and the resulting adjusted data are published in the Bituminous-coal Chapter and used for the productivity analyses therein. Employment figures on the anthracite industry represent full coverage for both productivity and injury analysis and are virtually identical. The Bureau of Labor Statistics, United States Department of Labor, publishes a third set of employment data, based upon payroll information. Bureau of Labor Statistics data are presented in table 11 to facilitate comparison with Bureau of Mines figures. The following indicates the order of difference between the Bureau of Labor Statistics data on total employment and the Bureau of Mines fully adjusted data:

(In thousands)

Year	Anthracite			Bituminous coal		
	Bureau of Labor Statistics data [1]	Bureau of Mines data [2]	Difference	Bureau of Labor Statistics data [1]	Bureau of Mines data [2]	Difference
1953	54.0	57.9	3.9	288.9	293.1	4.2
1954	40.1	44.0	3.9	228.5	227.4	1.1
1955	31.3	33.5	2.2	218.7	225.1	6.4
1956	29.3	31.5	2.2	228.6	228.2	−.4
1957	28.4	30.8	2.4	230.0	228.6	−1.4

[1] All employees, average for year.
[2] Average men working daily.

In no instance during the last 5 years have Bureau of Labor Statistics data and Bureau of Mines data moved in opposite directions, but the indicated size of change has differed markedly in the two sources.

The data in table 11 do permit comparison with other industries. Such analysis substantiates the conclusion that the recession was felt relatively early in coal as compared with petroleum and products of petroleum and coal.

The increase in bituminous employment (average men working daily) occurred in spite of the drop in production, because the number of days worked dropped to 203 compared with 214 in 1956. Employment in anthracite mines dropped in both average men working and in days worked (the latter being 196, compared with 216 in 1956).

Productivity.—The productivity of labor continued to increase in bituminous-coal mining and fell slightly in anthracite mining. The net tons per man per day reached 10.59 in bituminous-coal mining (an alltime high) and was 4.18 in anthracite mining as compared with 10.28 and 4.25, respectively, in 1956, and 6.42 and 2.78 in 1947, 10 years ago.

Hours and Earnings.—There was an 80-cent-per-day increase in the wage rates at bituminous-coal mines on April 1, 1957. Average weekly earnings and average hourly earnings increased in all categories, as shown in table 12, but average weekly hours dropped. The drop in weekly hours accelerated toward the end of the year as the general business recession developed.

Labor-Turnover Rates.—The data presented in table 13 are sensitive indicators of the state of business. The downturns in activity during 1957 are clearly reflected.

TABLE 11.—Total employment in the mineral-fuel industries in the continental United States 1948–52 (average) and 1953–57, by industries [1]

(Thousands)

Year and month	Mining				
	Total	Anthracite	Bituminous coal	Crude-petroleum and natural-gas production	Petroleum and natural-gas production, except contract services [2]
1948–52 (average)	720.0	72.9	383.7	263.4	(3)
1953	640.3	54.0	288.9	297.4	(3)
1954	572.4	40.1	228.5	303.8	(3)
1955	567.1	31.3	218.7	317.1	189.0
1956	582.7	29.3	228.6	324.8	192.3
1957:					
January	587.4	30.8	236.0	320.6	189.5
February	588.1	30.7	236.4	321.0	189.6
March	582.6	30.2	233.0	319.4	189.0
April	579.9	28.4	231.6	319.9	190.5
May	577.1	26.4	231.0	319.7	190.0
June	597.3	30.4	233.7	333.2	197.8
July	593.3	30.8	223.1	339.4	202.8
August	596.2	27.1	229.1	340.0	202.7
September	589.2	28.2	227.9	333.1	198.6
October	578.9	27.2	227.8	323.9	192.5
November	572.3	24.0	225.7	322.6	190.9
December	571.5	26.0	224.2	321.3	191.9
Year (average)	584.6	28.4	230.0	326.2	193.8

	Manufacturing		
	Total products of petroleum and coal	Petroleum refining	Coke, other petroleum, and coal products
1948–52 (average)	249.3	198.6	50.7
1953	260.4	206.3	54.1
1954	253.4	203.6	49.8
1955	252.8	201.3	51.5
1956	252.1	200.8	51.3
1957:			
January	247.1	199.1	48.0
February	249.3	199.1	50.2
March	248.5	198.6	49.9
April	249.3	199.4	49.9
May	249.5	199.1	50.4
June	251.2	199.8	51.4
July	251.8	200.5	51.3
August	252.9	201.5	51.4
September	252.7	200.9	51.8
October	249.2	197.7	51.5
November	247.7	197.3	50.4
December	244.8	196.3	48.5
Year (average)	249.5	199.1	50.4

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[1] U. S. Department of Labor, Bureau of Labor Statistics, latest revisions available Nov. 15, 1958. Published currently in the Monthly Labor Review, table A-2. Data are for "all employees"; those for "production and nonsupervisory workers" are also available in this publication.

[2] Not included in total because data are also included with crude-petroleum and natural-gas production.

[3] Data not available.

TABLE 12.—Average hours and gross earnings of production or nonsupervisory workers in the mineral fuels and related industries in the United States, 1948–52 average and 1953–57 [1]

Year and month	Mining											
	Total fuels [2]			Anthracite			Bituminous coal			Petroleum and natural gas production except contract services		
	Average weekly earnings	Average weekly hours	Average hourly earnings	Average weekly earnings	Average weekly hours	Average hourly earnings	Average weekly earnings	Average weekly hours	Average hourly earnings	Average weekly earnings	Average weekly hours	Average hourly earnings
1948–52 (average)	$71.93	35.7	$2.01	$68.49	32.2	$2.02	$72.33	35.0	$2.07	$75.50	40.6	$1.86
1953	85.01	35.6	2.40	69.34	28.3	2.45	85.31	34.4	2.48	90.39	40.9	2.21
1954	84.04	35.2	2.40	73.68	30.7	2.40	80.85	32.6	2.48	91.94	40.5	2.27
1955	94.13	38.4	2.46	78.73	33.5	2.35	96.26	37.6	2.56	94.19	40.6	2.32
1956	102.61	38.6	2.66	78.96	32.9	2.40	106.22	37.8	2.81	101.68	41.0	2.48
1957:												
January	107.33	38.7	2.78	93.19	35.3	2.64	110.63	37.5	2.95	104.83	41.6	2.52
February	106.49	38.5	2.77	80.83	30.5	2.65	112.51	38.4	2.93	101.91	40.6	2.51
March	103.96	37.7	2.76	73.41	27.7	2.65	109.58	37.4	2.93	101.25	40.5	2.50
April	105.80	37.7	2.81	81.69	31.3	2.61	111.74	37.0	3.02	100.75	40.3	2.50
May	104.49	37.0	2.84	77.78	29.8	2.61	107.76	35.8	3.01	104.23	40.4	2.58
June	110.74	38.5	2.88	88.25	33.3	2.65	114.68	37.6	3.05	109.18	41.2	2.65
July	108.95	37.7	2.89	81.72	32.3	2.53	112.17	36.3	3.09	110.00	41.2	2.67
August	107.23	37.5	2.87	80.07	30.1	2.66	110.96	36.5	3.04	106.52	40.5	2.63
September	111.51	38.5	2.91	92.22	34.8	2.65	112.91	36.9	3.06	113.28	41.8	2.71
October	107.27	37.4	2.87	81.27	30.9	2.63	110.66	36.4	3.04	106.92	40.5	2.64
November	102.98	35.7	2.90	76.85	29.0	2.65	102.18	33.5	3.05	109.34	40.8	2.68
December	106.57	36.9	2.89	70.76	26.6	2.66	107.92	35.5	3.04	111.64	41.5	2.69
Total 1957	107.11	37.7	2.85	81.79	31.1	2.63	110.53	36.6	3.02	106.75	40.9	2.61

Year and month	Manufacturing								
	Total: Products of petroleum and coal			Petroleum refining			Coke, other petroleum, and coal products		
	Average weekly earnings	Average weekly hours	Average hourly earnings	Average weekly earnings	Average weekly hours	Average hourly earnings	Average weekly earnings	Average weekly hours	Average hourly earnings
1948–52 (average)	$76.48	40.7	$1.88	$79.68	40.3	$1.97	$65.82	42.0	$1.57
1953	90.17	40.8	2.21	94.19	40.6	2.32	78.81	41.7	1.89
1954	92.62	40.8	2.27	96.22	40.6	2.37	80.93	41.5	1.95
1955	97.00	41.1	2.36	100.37	40.8	2.46	86.31	41.9	2.06
1956	104.39	41.1	2.54	108.39	40.9	2.65	91.32	41.7	2.19
1957:									
January	106.45	41.1	2.59	110.68	41.3	2.68	93.38	40.6	2.30
February	104.45	40.8	2.56	107.86	40.7	2.65	93.52	41.2	2.27
March	104.60	40.7	2.57	108.26	40.7	2.66	92.57	40.6	2.28
April	106.71	41.2	2.59	110.95	41.4	2.68	92.57	40.6	2.28
May	106.75	40.9	2.61	110.84	40.9	2.71	93.02	40.8	2.28
June	108.79	40.9	2.66	113.70	40.9	2.78	94.30	41.0	2.30
July	111.64	41.5	2.69	115.92	41.4	2.80	98.41	41.7	2.36
August	109.21	40.6	2.69	111.60	40.0	2.79	101.39	42.6	2.38
September	113.30	41.5	2.73	117.01	41.2	2.84	101.81	42.6	2.39
October	110.03	40.6	2.71	113.36	40.2	2.82	99.66	41.7	2.39
November	111.11	40.7	2.73	115.87	40.8	2.84	95.51	40.3	2.37
December	111.38	40.8	2.73	116.31	41.1	2.83	94.33	39.8	2.37
Total 1957	108.39	40.9	2.65	112.88	40.9	2.76	96.00	41.2	2.33

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[1] U. S. Department of Labor, Bureau of Labor Statistics, latest revisions available Nov. 15, 1958. Published currently in the Monthly Labor Review, tables A-3 and C-1.

[2] Weighted average computed by authors, using employment as weights.

TABLE 13.—Labor turnover, mineral fuels and related industries, 1956 average and 1957 by months [1]

(Per thousand employees)

Year and month	All manufacturing	Products of petroleum and coal	Petroleum refining	Anthracite mining	Bituminous coal mining
Total accession rate:					
1956 average	34	12	8	14	12
1957:					
January	32	8	5	16	18
February	28	9	5	15	7
March	28	8	7	15	8
April	28	12	7	11	9
May	30	12	9	11	8
June	39	33	31	8	9
July	32	15	9	20	11
August	32	10	6	14	12
September	33	12	6	17	11
October	29	7	5	14	8
November	22	5	3	12	7
December	17	5	4	7	5
Average	29	11	8	13	9
Total separation rate:					
1956 average	35	12	8	15	13
1957:					
January	33	10	7	15	10
February	30	8	6	12	10
March	33	17	10	18	16
April	33	15	12	13	13
May	34	10	8	13	14
June	30	9	7	103	15
July	31	8	6	15	22
August	40	18	15	15	20
September	44	30	28	12	16
October	40	19	15	15	15
November	40	16	11	23	25
December	38	13	9	35	20
Average	36	14	11	24	16
Layoff rate:					
1956 average	15	3	2	4	6
1957:					
January	15	3	1	1	4
February	14	1	(2)	1	5
March	14	4	3	7	10
April	15	9	7	4	6
May	15	3	3	4	8
June	11	1	(2)	99	9
July	13	2	1	1	14
August	16	4	3	4	13
September	18	9	9	5	8
October	23	10	8	5	9
November	27	11	6	14	20
December	27	6	3	27	16
Average	17	5	4	14	10

[1] U. S. Department of Labor, Bureau of Labor Statistics, Monthly Labor Review, 1957, monthly issues.
[2] Less than 0.5.

PRICES AND COSTS

Prices.—The average wholesale prices of fuels increased during 1957, reaching 117.2 as compared with 111.2 in 1956, a greater increase than that for all commodities. Although all categories shared the increase, it was especially marked in coal, and petroleum and its products. Table 15 summarizes the actual price changes in representative mineral fuels.

Costs.—An index of major input expenses in anthracite, bituminous-coal, and crude-petroleum mining has been constructed by the Office of the Chief Economist, Bureau of Mines. This index does not compare the actual cost of producing these fuels among themselves but only indicates the changes in operating costs for each since 1947. The labor input has been adjusted for productivity changes for bituminous coal and anthracite (using the data in table 16) but has not been so adjusted for crude petroleum. The weights are based upon the 1954 Census of Mineral Industries. The categories of expense considered are labor, supplies, fuels, and purchased electric energy. These indexes do not include capital costs. A comparable index for metal mining is presented in the Review of the Mineral Industries Chapter, volume I, Minerals Yearbook.

TABLE 14.—Average monthly wholesale price indexes for selected fuels, 1948–52 average and 1953–57 [1]

(1947–49=100)

Year and month	Fuels total	Coal	Coke	Gas	Electricity	Petroleum and products
1948–52 (average)	105.1	107.1	116.1	101.3	99.8	107.1
1953	109.5	112.8	132.0	107.8	99.1	112.7
1954	108.1	106.3	132.5	108.8	101.8	110.8
1955	107.9	104.8	135.2	111.6	97.4	112.7
1956	111.2	114.5	149.7	115.1	94.2	118.2
1957 (average)	117.2	124.4	161.7	116.1	95.5	127.0
January	116.3	124.1	159.1	119.9	94.9	124.9
February	119.6	124.0	162.2	122.3	94.3	131.0
March	119.2	123.6	161.9	118.4	94.9	130.7
April	119.5	123.2	161.9	118.4	96.6	130.4
May	118.5	123.3	161.9	116.5	94.9	129.8
June	117.2	123.3	161.9	113.0	94.3	128.4
July	116.4	124.0	161.9	111.8	95.5	126.4
August	116.3	124.4	161.9	111.1	96.6	125.5
September	116.1	124.8	161.9	112.2	95.5	125.6
October	115.8	125.6	161.9	112.2	96.1	124.6
November	115.7	125.8	161.9	116.0	96.1	123.5
December	116.2	126.3	161.9	120.7	96.1	123.5

[1] U. S. Department of Labor, Bureau of Labor Statistics, Monthly Labor Review, table D-8.

TABLE 15.—Comparative fuel prices, 1956–57

Fuel	1956	1957
Bituminous coal:		
Average wholesale prices, dollars per net ton: [1]		
Large domestic sizes, f. o. b. car at mine, to retail dealers	7.10	7.45
Domestic stoker, f. o. b. car at mine, to retail dealers	6.62	7.00
Screenings for industrial use, f. o. b. car at mine, to industrial consumers	5.08	5.56
Metallurgical coal, f. o. b. car at mine, to coke manufacturers	6.19	6.64
Other average prices, dollars per net ton:		
Railroad fuel, f. o. b. mine [2]	5.03	5.53
Average retail price [1]	15.65	16.28
Cost of coal at merchant coke ovens	9.85	10.76
Anthracite, average sales realization per net ton on shipments to points outside regions, excluding dredge coal, dollars:		
Chestnut	12.07	13.06
Pea	8.95	10.39
Buckwheat No. 1	7.16	9.21
Petroleum and petroleum products:		
Crude petroleum, average price per barrel at well — dollars	[3] 2.79	3.09
Gasoline, average dealers' net price (excluding taxes) of gasoline in 50 U. S. cities — cents per gallon [4]	16.34	16.69
Residual fuel oil:		
No. 6 fuel oil, average of high and low prices in Philadelphia — dollars per barrel (refinery) [4]	2.96	3.31
Bunker C, average price for all Gulf ports — do [4]	2.19	2.85
Distillate fuel oil:		
No. 2 distillate, average of high and low prices at Philadelphia — cents per gallon (refinery) [4]	10.4	11.1
No. 2 distillate, average for all Gulf ports — do [4]	9.2	10.0
Natural gas:		
Average U. S. value, at well — cents per thousand cubic feet	10.8	11.3
Average U. S. value, at points of consumption — do	41.5	43.1
Average wholesale price index for all commodities [1]	114.3	117.6

[1] Bureau of Labor Statistics, U. S. Department of Labor, published and unpublished wholesale prices and price indexes.
[2] Interstate Commerce Commission.
[3] Revised.
[4] Platt's Oil Price Handbook.

Index of major input expenses

(1949=100)

Year	Anthracite	Bituminous coal	Crude petroleum and natural gas	Year	Anthracite	Bituminous coal	Crude petroleum and natural gas
1947	92	88	87	1953	113	104	118
1948	99	101	99	1954	95	94	120
1949	100	100	100	1955	95	93	122
1950	105	99	103	1956	92	98	129
1951	112	106	112	1957	101	102	134
1952	112	104	115				

These figures (except petroleum) seem to be related more directly to the business cycle than to any long trend. The indexes were relatively high (for anthracite and bituminous coal) during the postwar slumps in business activity—1949, 1953, and 1957.

Relative Labor Costs.—The most important element in operating costs is, of course, wages and salaries. The index of relative labor costs adjusts average earnings by changes in productivity to indicate the direction of movement in real labor costs per ton of coal. When the changes in value of a ton of coal are considered, an index of labor costs per dollar of product is obtained. The changes have been remarkably slight in the coal industries since 1949.

TABLE 16.—Indexes of relative labor cost, anthracite and bituminous-coal mining, 1949–57

(1949=100)

Year	Index of labor costs per ton of product [1]		Index of value of product per man-day [2]		Index of labor cost per dollar of product [3]	
	Anthracite	Bituminous	Anthracite	Bituminous	Anthracite	Bituminous
1949	100	100	100	100	100	100
1950	106	98	104	105	101	99
1951	113	104	116	111	101	103
1952	113	102	115	117	105	101
1953	114	101	127	128	103	100
1954	91	87	138	137	93	94
1955	91	86	124	141	100	94
1956	86	91	139	158	92	92
1957	96	95	149	172	94	91

[1] Index based upon net tons per man per day (from coal chapters, this volume) and index of average earnings derived from Bureau of Labor Statistics data on hourly earnings.
[2] Index based upon net tons per man per day and mine values of production.
[3] Index based on index of value per man-day and index of average earnings.

INCOME AND INVESTMENT

National Income Originated.—The fuels industries fared relatively well during 1957 as compared with other mining but did not match the gains in all industries in national income originated. The gains over 1956 for anthracite and bituminous- and other soft-coal mining and crude petroleum and natural gas were not as great as in 1956 over 1955, reflecting the slump in business activity. The manufacturing category of products of petroleum and coal was relatively hard hit, dipping over 7 percent, compared with a 2-percent increase for all manufacturing.

TABLE 17.—National income by industrial origin, selected industries, 1956–57 [1]

Industry	1956 (million dollars)	Change from 1955 (percent)	1957 (million dollars)	Change from 1956 (percent)
All industries	349,356	+6	363,951	+4
Mining	6,265	+12	6,191	−1
Metal mining	1,095	+11	847	−23
Anthracite mining	168	+26	171	+2
Bituminous- and other soft-coal mining	1,555	+18	1,609	+3
Crude petroleum and natural gas	2,603	+8	2,783	+7
Nonmetallic mining and quarrying	844	+11	781	−7
Manufacturing	109,901	+5	112,517	+2
Products of petroleum and coal	4,378	+8	4,063	−7

[1] U. S. Department of Commerce, Survey of Current Business, July 1958, table 6.

Investment.—Data on the total investment in fuels are not available. Table 18 presents data on direct private investments abroad in the petroleum industry. The only information available on book values of domestic investments appears in the statistical summary of balance-sheet data from corporate income-tax returns. These reports are issued only after almost 2 years' delay—data for the fiscal year ended July 1956 are the latest available. As compared with a total book value of foreign investments at the end of 1956 for petroleum industries ($7.3 billion), the total book value of assets in crude petroleum and products (including coal products) was $36.3 billion. To indicate growth in domestic investment, the figure for fiscal 1952 was $28.9 billion.

Indications of the current rates of investment are given by data on expenditures on new plant and equipment in the manufacturing industries and by data on gross proceeds of new corporate security offerings. The recession is reflected in the new plant and equipment

TABLE 18.—Direct private investment of the United States in foreign petroleum industries, 1957 [1]

(Million dollars; net inflows to the United States (—))

Country	Petroleum				All industries			
	Book value beginning of year	Net capital movements	Undistributed earnings of subsidiaries	Book value end of year	Book value beginning of year	Net capital movements	Undistributed earnings of subsidiaries	Book value end of year
Canada	1,768	322	56	2,154	7,460	584	274	8,332
Latin American Republics:								
Brazil	211	7	9	227	1,218	48	35	1,301
Central America	325	14	53	392	1,030	25	86	1,132
Colombia	107	10	−11	106	298	9	−9	297
Mexico	17	(2)	1	18	690	61	36	787
Venezuela	1,411	736	32	2,179	1.829	795	58	2,683
Total [3]	2,232	828	101	3,161	7,459	1,104	251	8,805
Western European countries	992	120	70	1,184	3,520	254	236	3,993
Western European dependencies	569	57	18	644	805	66	34	906
Liberia	263	(4)	(4)	296	334	15	30	380
All other countries	1,455	6	118	1,543	2,599	49	192	2,836
Total, all areas	7,280	1,332	364	8,981	22,177	2,072	1,017	25,752

[1] U. S. Department of Commerce, Survey of Current Business, vol. 38, No. 9, September 1958, pp. 18–19.
[2] Less than $500,000.
[3] Includes countries not shown above.
[4] Combined in "All industries" data.

expenditures, which for mining remained virtually unchanged over 1956.

TABLE 19.—New plant and equipment expenditures, mineral fuels and related industries, 1953–57 [1]

(Million dollars)

Year	Mining, including fuels	Manufacturing: petroleum and coal products	Total manufacturing	Year and quarter	Mining, including fuels	Manufacturing: petroleum and coal products	Total manufacturing
1953	986	2,668	11,908	1957	1,243	3,453	15,959
1954	975	2,684	11,038	January–March	300	728	3,505
1955	957	2,798	11,439	April–June	327	892	4,183
1956	1,241	3,135	14,954	July–September	314	894	4,010
				October–December	302	939	4,261

[1] U. S. Department of Commerce, Office of Business Economics, Survey of Current Business, March 1958, p. 12.

TABLE 20.—Estimated gross proceeds of new corporate securities offered for cash [1]

Type of security	Total corporate		Manufacturing		Mining [2]	
	Million dollars	Percent	Million dollars	Percent	Million dollars	Percent
Bonds	9,957	77	2,858	68	204	71
Preferred stock	411	3	94	2	6	2
Common stock	2,516	20	1,282	30	79	27
Total	12,884	100	4,234	100	289	100

[1] U. S. Securities and Exchange Commission, Statistical Bulletin, vol. 17, No. 5, May 1958, p. 10. Substantially all new issues of securities offered for cash sale in the United States in amounts over $100,000 and with terms to maturity of more than 1 year are covered in these data.

[2] Including fuels.

TRANSPORTATION

As indicated in table 21, within recent years the methods of shipping bituminous coal and lignite from the mines have changed radically; shipments by rail have declined, whereas shipments by water and truck have increased. Generally, the cost by water or truck, particularly for short distances, is less than the rail freight rate, which increased 3.5 percent over 1956. Transportation costs compose a significant portion of the delivered price of coal, thus placing it at a competitive disadvantage with oil and natural gas, which are moved by tankers and pipelines. About 75 percent of all coal moves by rail, and freight adds as much as 70 percent to the mine price of coal. As a consequence, considerable attention is being given to means of substantially reducing transportation costs. Among these is the locating of large coal-consuming industries at or near sources of coal (particularly near water transportation), increased barging and trucking of coal, and transmission of electric energy directly from mine-located generating plants. A commercial coal pipeline was placed in operation in Ohio during the year.

The total movement of mineral fuels and related products by rail and water is summarized in table 22.

TABLE 21.—Method of shipment of bituminous coal and lignite from mines, and used at mines, in the United States, 1953–57

Year	Method of shipment from mines			Used at mines [1]	Total production
	Shipped by rail and trucked to rail	Shipped by water and trucked to water	Trucked to final destination		
THOUSAND NET TONS					
1953	362, 133	35, 648	47, 102	12, 407	457, 290
1954	305, 918	32, 912	44, 689	8, 187	391, 706
1955	355, 924	47, 476	51, 607	9, 626	464, 633
1956	390, 015	50, 732	49, 768	10, 359	500, 874
1957	381, 562	50, 080	50, 334	10, 728	492, 704
PERCENTAGE OF TOTAL					
1953	79. 2	7. 8	10. 3	2. 7	100. 0
1954	78. 1	8. 4	11. 4	2. 1	100. 0
1955	76. 6	10. 2	11. 1	2. 1	100. 0
1956	77. 9	10. 1	9. 9	2. 1	100. 0
1957	77. 4	10. 2	10. 2	2. 2	100. 0

[1] Includes coal used by mine employees, taken by locomotive tenders at tipples, used at mines for power and heat, transported from mines to point of use by conveyors or trams, made into beehive coke at mines, and employed for all other purposes at mines.

TABLE 22.—Rail and water transportation of mineral fuels and related products in the United States, 1956–57, by products

(Thousand short tons)

Product	Rail [1]			Water [2]		
	1956	1957	Change from 1956 (percent)	1956	1957 [3]	Change from 1956 (percent)
Coal:						
Anthracite [4]	35, 106	30, 285	−14	1, 957	1, 261	−36
Bituminous [4]	380, 727	372, 194	−2	150, 640	151, 161	+(5)
Coke [4]	21, 528	19, 564	−9	477	480	+1
Crude petroleum	2, 192	2, 046	−7	67, 336	74, 090	+10
Gasoline	9, 803	8, 853	−10	87, 617	90, 640	+3
Distillate fuel oil	10, 379	9, 553	−8	74, 390	69, 125	−7
Residual fuel oil				45, 200	43, 940	−3
Asphalt	4, 076	3, 495	−14	3, 096	3, 329	+8
Kerosene	16, 130	15, 543	−4	10, 410	8, 918	−14
Other				9, 795	9, 776	−(5)
Total	479, 941	461, 533	−4	450, 918	452, 720	+(5)

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[1] Revenue freight originated, excluding forwarder and less than carlot shipments, for which categories commodity detail is not available. Source: Interstate Commerce Commission, Freight Commodity Statistics, Class I Steam Railways in the United States, for years ended Dec. 31, 1956 and 1957: Statements 57100 and 58100.

[2] Domestic traffic; that is, all commercial movements between any point in continental United States or its Territories and possessions and any other such point. Traffic with the Panama Canal Zone, the Virgin Islands, and military cargoes carried in Defense Department vehicles are excluded. Source: Department of the Army, Waterborne Commerce of the United States, Calendar Year 1956, part 5, National Summaries, and preliminary tabulations for the 1957 volume.

[3] Preliminary figures.

[4] Figures for rail shipments include briquets. For water shipment briquets not reported by type of material and included with "Other." The rail figure for anthracite is higher than domestic production because it duplicates shipments to washers and breakers and shipments from the same.

[5] Less than 0.5 percent.

DISTRIBUTION OF BITUMINOUS COAL AND LIGNITE

Tables 23, 24, and 25 summarize the distribution of bituminous coal and lignite in 1957 from coal-producing districts of origin to States of destination, by methods of transportation and types of consumer use. This information shows the participation of the bituminous-coal and lignite industry in the various energy markets of the Nation, both locally and nationally. They also provide benchmarks for special studies and analyses of the many factors that influence coal production and its utilization in the highly competitive energy market.

The information is based upon reports submitted to the Bureau of Mines voluntarily by producers, sales agents, distributors, and whole-

TABLE 23.—Distribution of bituminous coal and lignite, 1957, by method of movement and consumer use

(Thousand net tons)

Shipments	Consumer use					
	Electric utilities	Coke and gas plants	Retail dealers	All others	Railroad fuel	Used at mines and sales to employees
I. Total shipments to all destinations in the United States, Alaska, and Canada, by all methods of movement and consumer use, and overseas exports	160,754	112,901	39,230	108,710	9,582	3,125
II. Shipments to all destinations in the United States, Alaska, and Canada, by specific method of movement and consumer use:						
A. Methods of movement:						
All rail	74,273	51,662	29,411	70,318		
River and ex river	37,293	34,699	926	5,549		
Great Lakes [1]	15,033	16,186	1,631	15,359		
Tidewater [2]	14,899	7,799	1,156	2,910		
Truck	13,284	1,592	6,074	13,976		
Tramway, conveyor, and private railroad	5,972	963	32	598		
B. Methods of movement and/or consumer uses unknown					9,582	3,125
C. Total	160,754	112,901	39,230	108,710	9,582	3,125

Shipments	Canadian Great Lakes commercial docks [3]	Net change in mine inventory	Overseas exports [4]	Total
I. Total shipments to all destinations in the United States, Alaska, and Canada, by all methods of movement and consumer use, and overseas exports	2,785	1,142	55,666	493,895
II. Shipments to all destinations in the United States, Alaska, and Canada, by specific method of movement and consumer use:				
A. Methods of movement:				
All rail				225,664
River and ex river				78,467
Great Lakes [1]				48,209
Tidewater [2]				26,764
Truck				34,926
Tramway, conveyor, and private railroad				7,565
B. Methods of movement and/or consumer uses unknown	2,785	1,142	55,666	72,300
C. Total	2,785	1,142	55,666	493,895

[1] Excludes shipments to Canadian Great Lakes commercial docks, for which consumer uses are not available.

[2] Excludes overseas exports for which consumer uses are not available.

[3] Consumer use unknown.

[4] Excludes Canada; consumer use unknown.

salers who normally produce or sell 50,000 tons or more annually. The unprecedented cooperation of these respondents resulted in their reporting almost 95 percent of all coal which they produced or shipped during the year. To account for total industry shipments, estimates

TABLE 24.—Distribution of bituminous coal and lignite by district of origin and consumer use

(Thousand net tons)

District of origin [1]	Consumer use					
	Electric utilities	Coke and gas plants	Retail dealers	All others	Railroad fuel	Used at mines and sales to employees
1	15, 188	5, 816	1, 291	12, 342	900	439
2	7, 358	31, 814	1, 184	5, 581	296	1, 382
3 and 6	22, 652	10, 759	1, 325	12, 651	991	108
4	19, 587	14	1, 888	13, 214	1, 609	65
7	3, 237	18, 392	6, 046	4, 678	198	181
8	29, 635	30, 540	12, 895	26, 127	2, 105	535
9	18, 276	----------	3, 632	6, 508	764	10
10	24, 129	622	6, 260	14, 305	1, 502	94
11	8, 475	4	1, 163	5, 677	497	40
12	845	----------	148	317	--------	1
13	5, 177	8, 567	490	1, 435	4	46
14	1	1, 299	10	269	--------	1
15 [2]	2, 714	250	461	1, 332	82	6
16	212	----------	100	333	--------	20
17	448	1, 636	389	457	9	37
18	42	----------	9	48	--------	9
19	513	----------	204	959	405	26
20	388	3, 188	1, 160	1, 156	20	29
21	1, 407	----------	432	651	7	80
22	----------	----------	80	152	177	3
23	470	----------	63	518	16	13
Total	160, 754	112, 901	39, 230	108, 710	9, 582	3, 125

District of origin [1]	Canadian Great Lakes commercial docks [3]	Overseas exports [3] [4]	Net change in mine inventory	Total
1	66	2, 446	60	38, 548
2	23	(5)	[6] 414	48, 052
3 and 6	799	1, 399	−19	50, 665
4	156	------------	328	36, 861
7	34	18, 654	52	51, 472
8	1, 698	32, 002	128	135, 665
9	9	------------	36	29, 235
10	------------	------------	77	46, 989
11	------------	------------	37	15, 893
12	------------	------------	----------	1, 311
13	------------	(5)	[6] 141	15, 860
14	------------	------------	----------	1, 580
15 [2]	------------	------------	3	4, 848
16	------------	------------	1	666
17	------------	------------	−2	2, 974
18	------------	------------	----------	108
19	------------	------------	9	2, 116
20	------------	926	−11	6, 856
21	------------	------------	3	2, 580
22	------------	------------	1	413
23	------------	97	26	1, 203
Total	2, 785	55, 666	1, 142	493, 895

[1] Producing districts are defined in Mineral Market Rept. 2824, August 1958.
[2] Excludes Texas.
[3] Consumer use unknown.
[4] Excludes Canada, consumer use unknown.
[5] Included in net change in mine inventory to avoid disclosure.
[6] Includes overseas exports, to avoid disclosure.

for the remaining shipments are included, based on data from coal trade and other reliable coal statistical reporting agencies.

Details of the distribution survey are shown in Bureau of Mines Mineral Market Report 2824.

TABLE 25.—Distribution of bituminous coal and lignite, 1957, by destination and consumer use

(Thousand net tons)

Destination	Consumer use				
	Total	Electric utilities	Coke and gas plants	Retail dealers	All others
New England:					
Massachusetts	5,354	2,574	751	755	1,274
Connecticut	4,106	2,567	594	140	805
Maine, New Hampshire, Vermont, and Rhode Island	2,450	871	----------	384	1,195
Middle Atlantic:					
New York	26,753	12,334	5,693	769	7,957
New Jersey	7,814	4,283	1,250	130	2,151
Pennsylvania	58,029	15,043	31,505	1,600	9,881
East North Central:					
Ohio	55,613	20,193	15,662	5,077	14,681
Indiana	34,936	12,854	13,735	2,793	5,554
Illinois	[1] 42,718	18,584	3,925	8,623	[1] 11,586
Michigan	26,256	9,838	4,877	3,369	8,172
Wisconsin	11,174	4,968	558	1,458	4,190
West North Central:					
Minnesota	5,334	1,810	1,206	554	1,764
Iowa	[1] 4,875	1,846	----------	1,252	[1] 1,777
Missouri	6,862	2,606	312	1,494	2,450
North Dakota and South Dakota	2,415	1,378	----------	516	521
Nebraska and Kansas	1,335	639	----------	260	436
South Atlantic:					
Delaware and Maryland	10,358	3,001	5,413	419	1,525
District of Columbia	1,097	608	----------	189	300
Virginia	10,552	4,435	165	1,756	4,196
West Virginia	15,771	6,291	5,741	303	3,436
North Carolina	8,715	4,953	----------	1,248	2,514
South Carolina	3,050	855	----------	321	1,874
Georgia and Florida	3,015	2,107	----------	530	378
East South Central:					
Kentucky	11,167	6,758	1,683	834	1,892
Tennessee	15,104	9,877	258	1,205	3,764
Alabama and Mississippi	17,013	6,938	8,439	455	1,181
West South Central: Arkansas, Oklahoma, and Texas	1,869	65	1,050	162	592
Mountain:					
Colorado	3,263	717	1,294	357	895
Utah	3,748	367	2,447	335	599
Montana and Idaho	924	1	----------	592	331
Wyoming	607	340	----------	61	206
New Mexico	92	37	----------	11	44
Arizona and Nevada	145	5	----------	24	116
Pacific:					
Washington and Oregon	1,324	4	----------	367	953
California	1,820	([2])	1,709	11	[2] 100
Alaska	829	470	----------	49	310
Canada	13,209	567	4,602	857	7,183
Destination and/or consumer uses not available:					
Great Lakes movement:					
Canadian commercial docks	2,785	----------	----------	----------	----------
Vessel fuel	1,859	----------	----------	----------	----------
Tidewater movement:					
Overseas exports (except Canada)	55,666	----------	----------	----------	----------
Bunker fuel	41	----------	----------	----------	----------
Railroad fuel:					
United States companies	7,697	----------	----------	----------	----------
Canadian companies	1,884	----------	----------	----------	----------
Coal used at mines and sales to employees	3,125	----------	----------	----------	----------
Net change in mine inventory	1,142	----------	----------	----------	----------
Grand total	493,895	----------	----------	----------	----------

[1] Shipments from District 15 to Illinois included with Iowa to avoid disclosure.

[2] Shipments to electric utilities included with all others to avoid disclosure.

WORLD REVIEW

In value terms, the United States is a net exporter of mineral fuels. Exports were valued at $1,829 million in 1957 compared with imports of $1,556 million. The value of imports and exports, grouped by standard industrial trade classification, are presented in table 26. By far the major export is coal.

Although United States exports of both bituminous coal and anthracite to Canada declined almost 3 million tons (12 percent), largely as a result of the increased indigenous availability of oil and natural gas in Canada, overseas exports increased almost 10 million tons (19 percent). In addition to currently increased energy requirements abroad, some of this increase resulted from a desire to accumulate coal stocks because of the uncertainty of future fuel supplies in consequence of the blockade of the Suez Canal late in 1956, plus reduction of ocean-vessel rates and favorable delivered prices of United States coal as compared with the cost of indigenous supplies and of coal from eastern Europe.

World Production.—The most notable coal-production increase in 1957 was made by the U. S. S. R., where total output, including bituminous coal, anthracite, and lignite, reached 463.0 million metric tons compared with 429.2 million tons in 1956—an increase of 33.8 million tons or about 8 percent. The U. S. S. R. share of total world output in 1957 was about 20 percent; approximately 150 million tons of the total was lignite.

Although Soviet coal-production statistics are impressive, their significance is diminished somewhat by the fact that they include large quantities of lower quality coals that average only half of the energy value of an equal weight of standard bituminous coal.

Approximately 29 percent of the total coal production in the U. S. S. R. in recent years has been lignite, while the remainder comprises about 15 percent anthracite and 56 percent bituminous coals of varying qualities and grades.

Production in the countries belonging to the Organization for European Economic Cooperation is summarized in table 27. Changes in total production in 1957 were slight compared with 1956.

World Trade Prices.—Price indexes of fuels in world trade increased during 1957. The increases were especially high in petroleum products, although all fuels shared the price rise.

GOVERNMENT ACTIVITIES

Oil-Import Program.—During the first half of 1957 the Suez crisis, which brought a subsequent shortage of fuel in Western Europe, eliminated any problem of excess petroleum imports into the United States. As a result, the voluntary oil-import program to limit imports into the United States was suspended for the period. However, by June 1957 the shortage of petroleum in Western Europe had been, to a large extent, overcome, and the problem of excess imports into the United States again became apparent. The Director of the Office of Defense Mobilization again indicated that he believed that crude oil was being imported into the United States in such quantities as to threaten to impair the national security.

TABLE 26.—Value of imports and exports, mineral fuels and products, 1955–57 [1]

(Dollars)

[U. S. Department of Commerce]

SITC No.	Group and commodity	Imports for consumption [2]			Exports of domestic merchandise		
		1955	1956	1957	1955	1956	1957
311-01	Coal (anthracite, bituminous, subbituminous, lignite)	2,641,156	2,885,148	3,154,642	441,062,820	732,125,564	828,683,874
311-02	Coke of coal and of lignite	1,405,250	1,470,676	1,543,519	8,238,079	11,468,264	14,356,494
311-03	Briquets of coal, of lignite, of coke, and of peat	--------	3,507	9,758	1,564,147	1,716,240	1,382,582
312-01	Petroleum, crude and partly refined for further refining	677,734,861	841,251,855	986,143,723	40,270,282	91,898,928	175,592,503
313-01	Motor spirit (gasoline and other light oil oils for similar uses), including gasoline blending agents	26,341,028	34,115,219	48,352,539	177,089,301	190,591,873	206,013,665
313-02	Lamp oil and white spirit (kerosine, illuminating oil)	165,655	896,072	536,530	10,665,086	13,157,459	22,235,653
313-03	Gas oil, diesel oil, and other fuel oils	319,884,731	383,638,215	496,072,014	134,709,270	175,300,958	278,114,012
313-04	Lubricating oils and greases, including mixtures with animal and vegetable lubricants	22,439	19,166	14,570	203,269,688	208,178,901	209,965,181
313-05	Mineral jelly and waxes (including petrolatum)	805,662	1,177,798	1,041,080	30,674,606	27,186,435	28,839,144
313-09	Pitch, resin, petroleum asphalt, coke of petroleum and other byproducts of coal, lignite, petroleum, and oil shale (including mixtures with asphalt), n. e. s., not chemicals	10,668,175	11,501,488	18,885,334	21,400,161	28,939,447	30,252,487
314-01	Gas, natural	--------	--------	--------	4,145,930	4,045,211	12,356,233
314-02	Gas, manufactured	--------	--------	--------	15,648,948	16,214,439	21,100,385
	Total fuels	1,039,668,957	1,276,959,144	1,555,753,709	1,088,738,318	1,500,823,719	1,828,892,213

[1] The grouping of the commodities is based upon Standard International Trade Classification of the United Nations. Basic data were compiled by the Office of the Chief Economist, Bureau of Mines, from a supplement to the Annual Statistical Bulletin Series IV by the Organization for European Economic Cooperation, which represents a conversion of United States import and export classification to SITC categories. Actual import and export data are taken from U. S. Department of Commerce Reports FT 110 and FT 410. Since the SITC categories may differ from those used by the Bureau of Mines, the values shown may not compare with those shown in the commodity chapters

[2] Includes items entered for immediate consumption, withdrawn from bonded storage warehouses for consumption, and withdrawn from bonded smelting and refining warehouses for consumption or export.

TABLE 27.—Monthly average of production of mineral fuels and products in selected OEEC countries, 1951–57 [1]

(Million metric tons)

Product	Member countries combined	Austria	Belgium	France	Saar	West Germany
Black coal:						
1951	38.50	(2)	2.47	4.41	1.36	9.91
1952	39.50	(2)	2.53	4.61	1.35	10.27
1953	39.20	(2)	2.51	4.38	1.37	10.37
1954	39.50	(2)	2.44	4.53	1.40	10.67
1955	39.70	(2)	2.50	4.61	1.44	10.89
1956	40.00	(2)	2.46	4.59	1.42	11.20
1957	40.00	(2)	2.42	4.71	1.37	11.09
Coking coal:						
1951	6.24	0.12	.51	.70	.32	2.80
1952	6.82	.13	.53	.79	.33	3.11
1953	6.77	.13	.50	.74	.31	3.15
1954	6.69	.14	.51	.79	.31	2.92
1955	7.46	.15	.55	.92	.34	3.39
1956	8.12	.17	.61	1.04	.35	3.63
1957	8.39	.18	.60	1.07	.37	3.78
Crude petroleum and natural gas:						
1951	.40	.19	----------	.03	----------	.11
1952	.48	.23	----------	.03	----------	.15
1953	.54	.25	----------	.03	----------	.18
1954	.62	.28	----------	.04	----------	.22
1955	.76	.31	----------	.07	----------	.26
1956	.85	.29	----------	.11	----------	.29
1957	.97	.27	----------	.12	----------	.33
Petroleum products:						
1951	53.50	[3].78	.85	17.25	----------	4.31
1952	67.99	[3].87	2.45	20.12	----------	4.90
1953	77.04	[3] 1.03	3.01	20.86	----------	5.84
1954	88.55	[3] 1.29	3.53	21.85	----------	7.86
1955	94.90	2.17	4.38	22.95	----------	9.26
1956	102.55	2.07	5.11	24.68	----------	10.31
1957	102.96	2.11	4.87	22.81	----------	10.78

Product	Italy	Netherlands	Turkey	United Kingdom	Other member countries
Black coal:					
1951	0.10	1.04	0.25	18.87	0.13
1952	.09	1.04	.25	19.17	.13
1953	.09	1.03	.31	18.98	.13
1954	.09	1.01	.30	18.97	.12
1955	.10	.99	.29	18.76	.12
1956	.09	.99	.31	18.80	.12
1957	.09	.95	.33	18.93	.13
Coking coal:					
1951	.18	.25	N. a.	1.36	----------
1952	.20	.27	N. a.	1.45	----------
1953	.20	.27	N. a.	1.48	----------
1954	.22	.28	N. a.	1.52	----------
1955	.25	.33	N. a.	1.53	----------
1956	.29	.35	N. a.	1.66	----------
1957	.31	.35	N. a.	1.73	----------
Crude petroleum and natural gas:					
1951	(4)	.06	(4)	----------	----------
1952	.01	.06	(4)	----------	----------
1953	.01	.07	(4)	----------	----------
1954	.01	.08	.01	----------	----------
1955	.02	.09	.02	----------	----------
1956	.05	.09	.03	----------	----------
1957	.11	.13	.03	----------	----------
Petroleum products:					
1951	6.92	6.39	(2)	15.50	1.50
1952	9.17	7.34	(2)	21.25	1.89
1953	11.96	8.65	(2)	23.90	1.79
1954	15.04	10.42	(2)	25.91	2.65
1955	16.07	11.89	(2)	25.24	2.94
1956	17.71	13.43	(2)	26.21	3.03
1957	19.56	14.07	(2)	25.27	3.49

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[1] General Statistics, Organization for European Economic Cooperation Statistical Bull., May 1958, No. 3, p. 19–25. Production of brown coal is not reported.

[2] Included in "Other countries."

[3] Refined for Austrian account.

[4] Less than 0.005 million metric tons.

TABLE 28.—World trade price indexes, 1951–57 [1]

(1953=100)

Mineral	1957	1956	1955	1954	1953	1952	1951
Crude petroleum:							
Kuwait	109.8	104.9	104.9	104.9	100.0	100.6	100.6
Saudi Arabia	113.3	106.6	106.6	106.6	100.0	94.5	94.5
United Kingdom	108.2	104.5	86.9	85.4	100.0	114.9	104.3
United States:							
West-Texas Sour	114.2	104.3	104.3	104.3	100.0	94.5	94.5
Refugio-Light	84.6	104.7	104.7	104.7	100.0	94.6	94.6
Saudi Arabian	115.5	107.3	96.2	94.7	100.0	126.9	114.0
Venezuelan	110.1	101.6	101.3	101.3	100.0	104.7	100.9
Venezuela:							
Export price f. o. b. Puerta La Cruz	110.1	101.4	104.0	104.3	100.0	95.3	95.3
Export price f. o. b. Amuay	112.9	102.2	102.2	102.2	100.0	99.6	102.2
Petroleum products:							
United Kingdom	120.4	105.4	100.0	98.0	100.0	104.1	95.2
United States distillate No. 2	118.5	109.9	106.2	102.5	100.0	98.9	96.3
United States gasoline	95.6	91.2	92.1	90.4	100.0	96.5	96.5
Coal:							
Canada	109.1	104.1	97.5	97.5	100.0	100.0	100.0
Germany	112.1	105.6	99.4	97.9	100.0	84.8	72.0
United Kingdom	140.0	129.1	99.1	96.4	100.0	100.0	86.4
United States	115.6	105.6	94.2	93.8	100.0	98.1	99.0

[1] United Nations, Monthly Bulletin of Statistics, March 1958, table 48, pp. 143–144.

TABLE 29.—Comparison of world and United States [1] production of mineral fuels, 1956–57

Mineral	1956			1957		
	World	United States		World	United States	
	Thousand short tons (unless otherwise stated)		Percent of world	Thousand short tons (unless otherwise stated)		Percent of world
Coal:						
Bituminous	1,701,042	497,997	29	[2] 1,751,809	[2] 487,362	[2] 28
Lignite	621,868	2,878	(3)	[2] 657,596	[2] 2,638	(2 3)
Pennsylvania anthracite	156,200	28,900	19	[2] 157,700	25,338	[2] 16
Coke (excluding breeze):						
Gashouse [4]	52,812	182	(3)	51,645	(5)	(5)
Oven and beehive	282,556	74,483	26	294,475	75,951	26
Fuel briquets and packaged fuel	119,400	1,584	1	121,800	1,152	(3)
Natural gas .... million cubic feet	(6)	10,081,923	(6)	(6)	(6)	(6)
Peat	58,990	292	(3)	70,300	316	(3)
Petroleum (crude) .. thousand barrels	6,124,171	2,617,283	43	6,440,350	2,616,778	41

[1] Including Alaska and noncontiguous Territories.
[2] Preliminary.
[3] Less than 1 percent.
[4] Includes low- and medium-temperature and gashouse coke.
[5] Bureau of Mines not at liberty to publish United States figure separately.
[6] Data not available.

In June the President appointed a Special Committee to Investigate Crude-Oil Imports to examine the problem. On July 29, 1957, this committee reported, recommending a Voluntary Oil-Import Program. This program was put into effect immediately. For the second half of 1957, imports of crude petroleum were voluntarily held to within 3.3 percent of the quota established by this committee. In December 1957 the Special Committee issued a second report recommending that the Voluntary Oil-Import Program be extended to the West coast, District V, during the first half of 1958.

Mine-Water Control.—A joint $17 million program for mine-water control in the anthracite-producing region of Pennsylvania was established in 1955 by the Federal Government and the Commonwealth of Pennsylvania. By the close of 1957, 16 projects with an aggregate cost (contracted or estimated) of nearly $5 million had been approved. The cost of the facilities—pumping installations and surface-drainage improvements—is shared equally by the Federal and State Governments.

The first project under the program was completed in 1957. It was a surface-drainage improvement estimated to reduce infiltration of surface water into underlying mineworkings by 200 million gallons per year.

COMPARISON OF BUREAU OF MINES AND BUREAU OF THE CENSUS MINERAL-FUELS-PRODUCTION DATA FOR 1954[1]

This section compares Bureau of Mines mineral-fuels-production data for 1954 with those of the Bureau of the Census, United States Department of Commerce, as presented in its 1954 Census of Mineral Industries reports.[2] Data are shown for continental United States, exclusive of Alaska, since priority is given in Bureau of the Census publications to showing detailed commodity figures for that area only.

Individual comparisons are designed to provide users of statistics of these agencies with a rough measure of the extent to which their coverages match. Table 30, which gives these comparisons, also includes industry shipments data from the Census reports to afford readers (1) an approximate measure of the extent to which a particular commodity is produced in the industry of which this commodity is the primary product; and (2) information on the extent to which that industry produces other commodities. This information should enable users to relate the statistics of the two agencies better.

The Bureau of Mines and the Bureau of the Census cooperated in gathering mineral-production and related data through the 1954 Census of Mineral Industries; this was the first such census since that for 1939. This cooperation involved various aspects, such as use of joint Census-Mines schedules in a number of mineral areas to collect 1954 data. The collection, editing, and processing of certain groups of such schedules were carried out for both agencies by Bureau of Mines personnel. In other areas each agency collected its data on a separate form, but provision was made for comparisons between agencies by means of tielines on individual forms. Last, in some areas each agency used its own form, with no provision for tieline comparison.[3] Each agency prepared its own tabulations and subsequent publications, in accordance with its own needs and responsibilities.

The Bureau of Mines collects annually from mineral producers, processors, and users—on a voluntary basis—information on mineral commodities at various stages in their progress from extraction to end use. Monthly or quarterly canvasses are also conducted for

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[1] Prepared by Robert E. Herman. Mineral Production (Comparison of Bureau of Mines and Bureau of the Census 1954 Data) chapter: Minerals Yearbook, 1957, volume I, covers all minerals, fuels and non-fuels.

[2] U. S. Department of Commerce, Bureau of the Census, U. S. Census of Mineral Industries, 1954: Vol. I, Summary and Industry Statistics, 1958 (issued earlier in subject and industry bulletin form).

[3] Table 31 in this section indicates the relationship between selected 1954 Census of Mineral Industries report forms and Bureau of Mines report forms.

TABLE 30.—Comparison of the Bureau of Mines and Bureau of the Census mineral-fuels production data for 1954[1]

(Continental United States only)

Mineral	Commodity data						Industry data (Bureau of the Census)[2]						
	Bureau of Mines data[3]			Bureau of the Census data			Industry or industry group (mineral specified is the primary product)	Industry code	Value of shipments and interplant transfers (thousand dollars; gross shipments[4] unless otherwise stated)				
									Total primary and secondary products produced in the industry	Primary products			Secondary products and services
	Measurement stage	Quantity	Value (thousand dollars)	Measurement stage	Quantity	Value (thousand dollars)				Total	Produced in specified industry	Produced in other industries	
Asphalt and related bitumens (native) (thousand short tons).	Sales	1,414	6,410	Net shipments.[4]	1,408	6,408	Native asphalt and bitumens.	1494	6,424	[5] 6,408	[5] 6,408		16
Coal (thousand short tons):													
Bituminous [6]	Production	386,797	1,752,847	Net production.[7] [8]	387,186	1,774,400	Bituminous coal	1211	2,040,200	[5] 1,774,983	[5] 1,773,930	[9] 1,053	4,406
Lignite	do	4,243	10,330	do [8] [10]	4,245	10,347	Lignite	1212	10,387	[5] 10,330	[5] 10,330		57
Pennsylvania anthracite.	do	29,083	247,870	do [11]	29,255	250,699	Anthracite	1111	365,536	[5] 246,276	[5] 246,276		2,237
Natural gas (billion cubic feet).	Marketed production.	8,743	882,501	Marketed production.	[12] 8,315	[13] 978,712	Crude petroleum and natural gas.	1312, 1313	7,070,097	7,095,624	7,035,108	[15] 60,516	34,989
Petroleum, crude (million 42-gallon barrels).	Production	2,315	6,424,930	Production [14]	2,221	6,156,659							
Natural-gas liquids (million gallons):													
Natural-gasoline and cycle products.	do	5,385	402,418	Net production.	5,391	[16] 397,745	Natural-gas liquids.	1314, 1315	640,422	[5] 576,828	[5] 576,828		6,038
LP-gases	do	5,204	178,994	do	5,338	[16] 184,500							
Peat (short tons)	do	244,163	2,258	Production	248,664	[16] 2,313	Peat	1498	2,326	[5] 2,307	[5] 2,307		19
Other fuels [17]			3,413										
Total			9,912,000			9,762,000							

[1] Based on data published by the Bureau of Mines in the Minerals Yearbook and by the Bureau of the Census in its 1954 Census of Mineral Industries, volume I. For discussion of the joint efforts of these agencies in collecting 1954 data and general differences in methods of compiling mineral production data, see text.

[2] Data are for a mining industry as defined by the Bureau of the Census for purposes of the 1954 Census of Mineral Industries; that is, the 1949 Standard Industrial Classification for nonmanufacturing industries, with a few modifications.

[3] For each mineral the series used in computing the Bureau of Mines value of mineral production is shown.

[4] Gross shipments totals include some duplication, to the extent that materials are transferred from one establishment to another for mineral preparation. "Net shipments" excludes this duplication. For the native asphalt and bitumens, lignite, and peat industries, "gross" and "net" shipments were the same since no such transfers were reported.

[5] Net shipments. See footnote 4.

[6] Includes small quantity of anthracite mined in States other than Pennsylvania.

[7] Includes net production (clean-coal equivalent of all coal mined, including coal produced and used at the same establishment for power or heat) of bituminous-coal industry (386,864,000 short tons—valued at Census average value of net shipments of that industry) and shipments of bituminous coal from operations in other industries (313,000 short tons) plus coal used for power or heat at such operations (9,000 short tons—valued at Census average value of shipments from such operations).

[8] The Bureau of Mines excludes from its statistics on bituminous coal and lignite mines producing less than 1,000 tons, while the Census excludes only establishments for which neither value of shipments nor expenses for production, development, and maintenance work amounted to $500 or more. Shipments by such small mines amounted to only 366,000 tons.

[9] Includes $488,000 for coal produced at State-owned or State-operated mines for use at State institutions.

[10] Net production as defined in footnote 7.

[11] Net production as defined in footnote 7. At the national level, this represents for anthracite the sum of the breaker, washery, and dredge product; raw coal sold for use without preparation; and anthracite used for colliery fuel. Coal used for colliery fuel has been valued as follows: Raw coal at Census average value of raw sold and prepared coal at Census average value of breaker, washery, and dredge product. Census figures cover some late reports and revisions processed by the Census Bureau after the Bureau of Mines had closed its tabulations.

[12] Approximated by Bureau of Mines from Census product data, that is, gross production less that (1) returned to underground formations for repressuring, pressure maintenance, and cycling and (2) vented to air, burned in flares, and other losses; to be as comparable as possible with Bureau of Mines data, items (1) and (2) cover operations of natural-gas-liquids plants, as well as crude-petroleum and natural-gas establishments. Bureau of the Census gross production total was only 92 percent of that of Bureau of Mines figure. However, since deductions for Census amounted to only 18 percent of Census gross production as compared with 20 percent for the Bureau of Mines, the marketed production derived from Census data equals 95 percent of the Bureau of Mines marketed production.

[13] Valued at Census average value, at well, of shipments, that is, net deliveries to natural-gasoline plants and deliveries to distributors, transmission companies, and consumers.

[14] Includes crude petroleum shipped, crude used in lease operations (valued at Census average value of crude shipped), and field condensate and drips shipped.

[15] Oil- and gas-field contract services industries (group 133).

[16] Valued at Census average values of net shipments.

[17] Includes helium ($3,202,000) not included in the scope of the Census, since all is produced in Government owned and operated plants; and estimated value of carbon dioxide, natural ($211,000) not shown separately in Census reports.

most minerals as well. Production data are generally tabulated and published on a commodity basis—that is, the total of a mineral commodity produced regardless of the industry classification (very roughly, the major activity) of the producer.

The Bureau of the Census, in its economic census program, which includes the Census of Mineral Industries, collects data on expenses, capital expenditures, horsepower of equipment, energy use, water intake, and other items related to production as well as product data. These data are collected on an establishment basis. Each establishment is then classified for purposes of tabulation and publication, according to its major activity, into an industry, as defined by the Standard Industrial Classification.[4]

TABLE 31.—Selected 1954 Census of Mineral Industries reporting forms and related Bureau of Mines forms

Census form		Relation to Bureau of Mines annual surveys[1]	Related Bureau of Mines form	
Number	Name		Number	Name
MC-11A	Pennsylvania Anthracite	Joint survey	6-1385A	Pennsylvania Anthracite.
			6-1386A	Pennsylvania Anthracite: Mines Without Preparation Plants.
			6-1388A	Pennsylvania Anthracite: Dredge Report.
MC-11B	Pennsylvania Anthracite Stripping Contract Services.	do	6-1387A	Pennsylvania Anthracite From Strip Pits and Culm Banks: Contractors' Report.
MC-12A	Bituminous Coal and Lignite.	do	6-1401A	Bituminous-Coal and Lignite Production and Mine Operation.
MC-12B	Distribution of Bituminous-Coal and Lignite Shipments.	None	--------------	
MC-12S	Coal (short form)	Joint survey	--------------	See MC-11A and MC-12A above.
MC-13A	Crude Petroleum and Natural Gas.	None		
MC-13B	Natural-Gas Liquids	Joint survey	6-1237A	Sulfur, Hydrogen Sulfide and Liquid Sulfur Dioxide Recovered as a Byproduct (joint for producers of natural-gas liquids only).
			6-1343A	Natural-Gasoline and Cycling Plants.
MC-13C	Oil- and Gas-Field Contract Services.	None		
MC-13X	Offshore Oil and Gas Operations.	None	--------------	
MC-13S	Oil and Gas (short form)	None		
MC-14K	Native Asphalt, Bitumens, Peat, and Graphite.	Joint survey	6-1292A	Production of Miscellaneous Minerals.
			6-1328A	Native Bitumens and Allied Substances.
			6-1391A	Peat.

[1] See text regarding cooperative efforts of the 2 agencies in collecting 1954 data. Where joint survey is indicated, the related Bureau of Mines forms were not used in 1954, both agencies obtaining their information from the Census form.

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[4] The Standard Industrial Classification used in the 1954 Census of Mineral Industries was that for nonmanufacturing industries issued in May 1949. A revised classification for all industries was issued in 1957.

Employment and Injuries in the Fuel Industries

By John C. Machisak

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INTRODUCTION

THIS CHAPTER of the Minerals Yearbook contains injury experience and related employment data for the coal-mining, coking, and oil and gas industries for 1957. Injury experience is measured by the number of injuries per million man-hours of exposure to the hazards of the particular industry.

Since the accident hazards for each of the three sections are not comparable, no attempt has been made to combine data for presenting an overall experience for the fuel section of the mineral industries. Discussions and tabulations, covering the injury and employment records of the mineral industry as a whole, are presented in volume III.

COAL

Injury experience at all coal mines in the United States was more favorable in 1957 than in the preceding year, according to reports received by the Bureau of Mines, United States Department of the Interior. The combined frequency rate (fatal and nonfatal) of 44.16 injuries per million man-hours of exposure to the hazards of the coal-mining industry was 6 percent lower than in 1956.

Nonfatal injuries at bituminous-coal, lignite, and anthracite mines were lower in both number and frequency of occurrence; fatality experience of the industry was higher. Sixty-four of the four hundred and seventy-seven fatal injuries resulted from 5 major disasters at bituminous-coal mines during the year. The last major disaster at an anthracite mine occurred on March 27, 1952; the bituminous-coal industry was free of such disasters from November 13, 1954, until January 18, 1957.

The average number of men working daily and their accumulated man-hours decreased 4 and 6 percent, respectively, under 1956. Employees averaged 7.83 hours per day for a total of 405.8 million man-hours or 1,627 hours per man during 1957.

Bituminous-Coal Mines.—The safety record of bituminous-coal and lignite mines in 1957 was 6 percent better than in the preceding year. Preliminary data showed that 14,991 fatal and nonfatal injuries occurred at a rate of 41.47 per million man-hours of exposure; in 1956 final data were 16,878 injuries, which resulted in a frequency rate of 44.02.

Of the 426 fatalities at bituminous-coal and lignite mines, 375 occurred in underground workings, 26 at surface operations connected with underground mines, 22 at strip pits, and 3 at auger mines.

The leading cause of accidents in coal mines, falls of roof, face, and rib, resulted in 197 deaths in the bituminous-coal and lignite industry. The 64 fatalities involved in 5 major disasters (a single accident that results in the death of 5 men or more) were classified as follows: 4 disasters killing 59 men were caused by explosions of gas, and 1 killing 5 men was caused by a coal-mine bump.

The average daily working force of 218,600 men accumulated 361.5 million man-hours of worktime in 209 active mine days. The average workyear per man was 1,654 hours.

Anthracite Mines—The injury-frequency rate at Pennsylvania anthracite mines declined 2 percent, owing entirely to a 14-percent decrease in the total number of injuries sustained.

Fifty-one men were killed in 1957—5 less than in 1956. However, because of a 12-percent decrease in total man-hours, the resulting rate of occurrence in 1957 was 3 percent higher than in 1956. Nonfatal

TABLE 1.—Employment and injury experience at coal mines in the United States, 1953–57

Industry and year	Average men working daily [1]	Average active mine days [2]	Million man-days worked	Million man-hours worked	Number of injuries		Frequency rates per million man-hours	
					Fatal	Nonfatal	Fatal	Nonfatal
Bituminous-coal mines:[3]								
1953	295,425	191	56.3	444.3	397	20,112	0.89	45.26
1954	241,919	177	42.8	337.7	334	14,746	.99	43.66
1955	225,611	210	47.3	373.6	360	15,971	.96	42.75
1956	227,804	212	48.4	383.4	392	16,486	1.02	43.00
1957 [4]	218,600	209	45.7	361.5	426	14,565	1.18	40.29
Anthracite mines:								
1953	55,701	169	9.4	69.3	64	4,146	.92	59.85
1954	41,786	164	6.8	50.2	62	2,972	1.23	59.18
1955	34,550	182	6.3	46.0	60	2,919	1.30	63.46
1956	32,564	212	6.9	50.2	56	3,333	1.12	66.37
1957	30,825	196	6.1	44.3	51	2,877	1.15	64.93
Total coal mines:								
1953	351,126	187	65.7	513.6	461	24,258	.90	47.23
1954	283,705	175	49.6	388.0	396	17,718	1.02	45.67
1955	260,161	206	53.6	419.6	420	18,890	1.00	45.02
1956	260,368	212	55.3	433.7	448	19,819	1.03	45.70
1957 [4]	249,425	208	51.8	405.8	477	17,442	1.18	42.98

[1] Average number of men at work each day mine was active. Because absenteeism and labor turnover are taken into consideration, this number is lower than number of men available for work, as measured by a count of names on payroll.

[2] Average in which operating time of each mine is weighted by average number of workers in mines.

[3] Includes lignite.

[4] Bituminous data for 1957 are preliminary.

injuries in 1957 were lower in both number and frequency—14 and 2 percent, respectively.

Of the 51 deaths chargeable to the anthracite industry, 49 occurred underground and 2 at independent breakers. Surface operations at underground and strip or open-cut mines were free from fatalities in 1957. Thirty of the underground deaths resulted from accidents involving falls of roof, face, and rib.

The average number of men working daily and total man-hours decreased 5 and 12 percent, respectively, from 1956. The number of active days declined from 212 in 1956 to 196 in 1957, the average workday from 7.29 to 7.26 hours, and the workyear from 1,542 hours to 1,438.

COKE

Work fatalities increased in the coke industry in 1957, and nonfatal injuries decreased. A 17-percent increase in the frequency of occurrence of fatalities was offset by a 22-percent decrease in the frequency of nonfatal injuries, resulting in a combined rate (fatal and nonfatal) of 4.38 injuries per million man-hours—the lowest since complete reports were made available to the Bureau of Mines in 1916. Employees at 21,130 ovens that operated consistently in 1957 worked 57.3 million man-hours and produced 80.9 million tons of coke and breeze. Each man averaged 2,830 hours for the year—an increase of 67 hours over 1956, although employment declined by 213 men. The average employee worked an 8-hour shift and coke ovens operated 9 days more than in 1956.

Slot-Type Ovens—There were 12 fatal and 197 nonfatal injuries reported in 1957—an increase of 20 percent in fatalities and a decrease

TABLE 2.—Employment and injury experience at coke plants in the United States, 1953–57

Industry and year	Average men working daily [1]	Average active plant days [2]	Million man-days worked	Million man-hours worked	Number of injuries		Frequency rates per million man-hours	
					Fatal	Nonfatal	Fatal	Nonfatal
Slot-type coke ovens:								
1953	21,011	362	7.6	61.1	8	332	0.13	5.43
1954	17,944	361	6.5	51.8	8	245	.15	4.73
1955	19,597	362	7.1	56.7	9	280	.16	4.94
1956	19,318	355	6.9	54.9	10	268	.18	4.89
1957	19,203	364	7.0	55.9	12	197	.21	3.53
Beehive-coke ovens:								
1953	2,429	201	.5	3.6	--------	93	--------	25.98
1954	1,265	71	.1	.7	--------	9	--------	13.40
1955	1,084	179	.2	1.5	--------	45	--------	30.96
1956	1,155	197	.2	1.7	--------	33	--------	19.41
1957 [3]	1,057	186	.2	1.5	--------	42	--------	28.55
All coke ovens:								
1953	23,440	345	8.1	64.7	8	425	.12	6.57
1954	19,209	342	6.6	52.5	8	254	.15	4.84
1955	20,681	352	7.3	58.2	9	325	.15	5.59
1956	20,473	346	7.1	56.6	10	301	.18	5.32
1957 [3]	20,260	355	7.2	57.3	12	239	.21	4.17

[1] Average number of men at work each day oven was active. Because absenteeism and labor turnover are taken into consideration, this number is lower than the number of men available for work, as measured by a count of names on payroll.

[2] Average in which operating time of each plant is weighted by average number of workers in the plant.

[3] Preliminary.

of 26 percent in nonfatal injuries compared with 1956. The increase in man-hours was not enough to prevent a rising frequency of occurrence in the fatal rate (0.21 per million man-hours) but did result in the lowest nonfatal rate (3.53) recorded in 42 years of reporting.

Production increased by 3 percent in 1957 and although employees were reduced by 115, these men accumulated 55.9 million hours of worktime, each averaged 2,909 hours. Plants operated 9 days more than in 1956 and worked a straight 8-hour shift.

Beehive-Coke Ovens—The beehive-coke industry has an outstanding record of 5 consecutive years of operation without a fatality. Nonfatal injuries, however, increased from 33 in 1956 to 42 in 1957. Employment decreased 8 percent, and man-days and man-hours declined 14 and 13 percent, respectively. Days worked averaged 11 less in 1957, and a work force reduced from 1,155 in 1956 to 1,057 produced 16 percent less coke than in 1956. The nonfatal frequency rate per million man-hours rose 47 percent—from 19.41 in 1956 to 28.55 in 1957.

OIL AND GAS

The injury-frequency rate of the oil and gas industry, which has decreased gradually during 6 years, was the lowest since statistics were first collected in 1942 by the Bureau of Mines, United States Department of the Interior. The 1956 rate of 9.32 injuries per million man-hours of exposure to the hazards of the industry was reduced to 8.93 in 1957. Injuries occurring in 1957 were slightly more than in the previous year, but man-hours worked also increased, accounting for the lowered rate of occurrence. Of the 11,547 injuries in the oil and gas industry, 121 were fatalities and permanent total disabilities, 472 were permanent partial disabilities, and 10,954 were temporary. Six departments that showed improvement in frequency of injury occurrence in 1957, compared with 1956 were: Exploration, drilling, pipeline gas, refining, marketing, and miscellaneous.

Employment and man-hours accumulated increased 5 percent; workers averaged 2,095 hours each during the year—15 hours less than in 1956.

TABLE 3.—Employment and injury experience in the oil and gas industry of the United States, 1953–57

Year	Average men working daily	Million man-hours worked	Number of injuries		Frequency rates per million man-hours	
			Fatal [1]	Nonfatal	Fatal	Nonfatal
1953	594,398	1,264	179	14,452	0.14	11.43
1954	580,783	1,229	122	12,796	.10	10.41
1955	617,274	1,303	135	13,038	.10	10.01
1956	585,486	1,236	147	11,372	.12	9.20
1957	617,596	1,294	121	11,426	.09	8.83

[1] Fatal and permanent total injuries combined.

CONCLUSION

The overall injury experience (fatal and nonfatal combined) of each phase of the fuel industries in 1957 improved over the preceding year. Fatalities, which were higher in both number and frequency of occurrence in the coal-mining and coking industries, were offset by the decreased number of nonfatal injuries in the two industries. The oil and gas industry attained its best safety record since data were collected by the Bureau of Mines in 1942; the number of nonfatal injuries increased but the number of fatal and permanent total injuries declined, and man-hours of worktime increased.

PART II. COMMODITY REVIEWS

A. *Coal and Related Products*

Coal—Bituminous and Lignite

By W. H. Young, R. L. Anderson, and E. M. Hall

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GENERAL SUMMARY

THE BITUMINOUS-COAL AND LIGNITE INDUSTRY declined slightly in 1957 compared with 1956. Production, consumption, and days worked decreased; however, average value and exports increased. Mechanization continued to expand during the year, sales of continuous mining machines increased, and the percentage of underground production mechanically loaded and tons per man per day rose to new highs.

Production.—The output of bituminous coal and lignite in 1957—492.7 million tons—was 2 percent less than the 500.9 million tons produced in 1956. The lower production in 1957 was due largely to decreased consumption in the United States as a result of a general decrease in business activity.

Production fluctuated very little during 1957. The only major fluctuation resulted from the miners' vacation period of 9 days in midsummer. According to the Bureau of Labor Statistics, United States Department of Commerce, time lost on account of strikes amounted to 136,000 man-days in 1957, compared with 377,000 in 1956.

Trend of Employment.—Employment increased slightly in 1957 compared with 1956.

Index to Capacity.—As it is impossible for all mines to operate every working day in the year, a conservative figure of 280 days for calculating potential capacity was suggested some years ago by the coal committee of the American Institute of Mining, Metallurgical, and Petroleum Engineers. The average output per day worked in

1957 was 2.4 million tons, which, if applied to 280 days, gives an annual potential output of 680 million tons, compared with the actual production of 492.7 million tons.

Mechanization.—A slightly larger proportion—85 percent—of coal was loaded mechanically at underground mines in the United States in 1957 than in the preceding year. Sales of continuous-mining machines increased in 1957. Production at auger mines decreased slightly from 1956.

Mechanical Cleaning.—Approximately 62 percent of the bituminous coal and lignite mined in the United States in 1957 was cleaned mechanically. The general trend toward mechanical cleaning has closely paralleled the growth of mechanical mining, partly because, in mechanical mining, more refuse is loaded with the coal, and thus more mechanical cleaning is required. Moreover, the bituminous-coal and lignite industry has attempted to meet consumers' demands for cleaner coal. A large portion of the remaining 38 percent was handpicked and screened into various sizes at tipples with no mechanical cleaning facilities.

Consumption.—Consumption of bituminous coal and lignite in the United States decreased 4 percent in 1957 from the preceding year. All classes of consumers except electric power utilities and oven-coke plants used less coal in 1957 than in 1956. Retail deliveries declined.

Trends of Fuel Efficiency.—As for many years past, electric public-utility powerplants scored new records in fuel efficiency.

Competition With Oil and Gas.—Although consumption of energy has increased steadily since 1920, the proportion supplied by bituminous coal and lignite has decreased consistently, indicating serious competition from oil and gas. Of total energy consumed in 1957, bituminous coal and lignite represented 26 percent; anthracite, 1; oil, 41; gas, 28; and waterpower, 4.

Electric-power utilities consumed 2 percent more bituminous coal, 8 percent more gas, and 9 percent more fuel oil in 1957 than in 1956.

Class I railroads decreased their consumption of coal 32 percent and their purchases of fuel oil and diesel fuel 4 percent in 1957 from 1956.

Stocks.—The reserve supply of bituminous coal and lignite in the hands of industrial consumers and retail coalyards increased from 78 million tons at the beginning of 1957 to 81 million tons at the end of the year. Stocks increased from a 62- to a 71-day supply. Stocks on the upper Lake docks decreased 157,498 tons from January 1 to December 31, 1957.

Exports.—In 1957 exports amounted to 76 million tons, an increase of 11 percent over 1956, of which 58 million tons was shipped to overseas destinations and 18 million tons to Canada.

SCOPE OF REPORT

These data include all coal produced in Alaska and the United States except Pennsylvania anthracite and Texas lignite. Alaska production is included in total production of the United States.

Throughout the chapter all tonnage figures represent net tons of marketable coal and exclude washery and other refuse. "Tons" refers to net short tons of 2,000 pounds.

Statistics for 1957 are final and are based upon detailed annual

TABLE 1.—Salient statistics of the bituminous-coal and lignite industry in the United States, 1956–57

	1956	1957	Change from 1956 (percent)
Production net tons	500, 874, 077	492, 703, 916	−1.6
Consumption in the United States do	432, 858, 000	413, 668, 000	−4.4
Stocks at end of year:			
Industrial consumers and retail yards do	78, 008, 000	80, 779, 000	+3.6
Stocks on upper Lake docks do	4, 881, 617	4, 724, 119	−3.2
Imports and exports: [1]			
Imports do	355, 701	366, 506	+3.0
Exports do	68, 552, 629	76, 342, 312	+11.4
Price indicators (average per net ton):			
Average cost of railroad fuel purchased, f. o. b. mines [2]	$5.03	$5.53	+9.9
Average cost of coking coal at merchant coke ovens	$9.85	$10.76	+9.2
Average retail price [3]	$15.65	$16.28	+4.0
Average railroad freight charge per net ton [2]	$3.45	$3.57	+3.5
Average value f. o. b. mines	$4.82	$5.08	+5.4
Equipment sold:			
Mobile loading machines	239	209	−12.6
Continuous-mining machines	154	168	+9.1
Augers	89	53	−40.4
Shuttle cars	560	488	−12.9
Conveyors:			
"Mother"	137	172	+25.5
Room or transfer	232	159	−31.5
Method of mining:			
Hand-loaded underground net tons	58, 372, 495	54, 911, 676	−5.9
Mechanically loaded underground do	307, 401, 548	305, 737, 465	−.5
Percentage of total underground production mechanically loaded	84.0	84.8	+1.0
Mined by stripping net tons	127, 055, 382	124, 108, 538	−2.3
Mined at auger mines do	8, 044, 652	7, 946, 237	−1.2
Mechanically cleaned do	292, 365, 384	304, 027, 194	+4.0
Number of mines	8, 520	8, 539	+.2
Average number of days worked [4]	214	203	−5.1
Average number of men working daily [4]	228, 163	228, 635	+.2
Production per man per day [4] net tons	10.28	10.59	+3.0
Fuel-efficiency indicator: Pounds of coal per kilowatt-hour at electric powerplants [5]	.94	.93	−1.1

[1] Bureau of the Census. U. S. Department of Commerce.
[2] Interstate Commerce Commission.
[3] Bureau of Labor Statistics, U. S. Department of Labor.
[4] Accident Analysis Branch, Federal Bureau of Mines.
[5] Federal Power Commission.

reports of production and mine operation furnished by producers. All but a small percentage of the output was covered by the reports submitted. For production not directly reported (chiefly that of small mines) it has been possible to obtain reasonably accurate data from the records of the various State mine departments (which have statutory authority to require such reports) or, in a few instances, from railroad carloadings. Thus, the report represents complete coverage of all mines having an output of 1,000 tons a year or more. The report does not attempt to include many small mines that produce less than 1,000 tons a year.

For 1955 to 1957, inclusive, the annual production form did not request information on employment. The figures on men working daily, days worked, man-days worked, and tons per man per day were obtained from the Accident Analysis Branch of the Bureau of Mines.

Additional details on statistical procedures are given in the following sections: Production by Months and Weeks, Number and Size of Mines, Mechanical Cleaning, Production by States and Counties, Consumption, Relative Rate of Growth of Mineral Fuels and Waterpower, and Stocks.

RESERVES*

TABLE 2.—Coal reserves of the United States, Jan. 1, 1953, by States

(In million short tons)

State	Estimated original reserves					Reserves depleted to Jan. 1, 1953		Remaining reserves Jan. 1, 1953	Recoverable reserves Jan. 1, 1953, assuming 50-percent recovery
	Bituminous coal	Subbituminous coal	Lignite	Anthracite and semianthracite	Total	Production [1]	Production plus loss in mining, assuming past losses equal production		
Alabama [2]	67,570				67,570	861	1,722	65,848	32,924
Arkansas	1,396		90	230	1,716	94	188	1,528	764
COLORADO [3]	90,258	9,437		713	100,408	484	968	99,440	49,719
GEORGIA	100				100	12	24	76	38
ILLINOIS	[4] 137,321				[4] 137,321	[5] 156	[5] 312	137,009	68,504
INDIANA	37,293				37,293	1,039	2,078	35,215	17,607
Iowa	29,160				29,160	348	696	28,464	14,232
KANSAS	[4] 20,774		(6)		20,774	[5] 6	[5] 12	20,762	10,381
Kentucky	123,327				123,327	2,177	4,354	118,973	59,487
MARYLAND	[4] 1,200				[4] 1,200	[5] 2	[5] 4	1,196	598
MICHIGAN	297				297	[7] 46	[8] 77	220	110
Missouri	79,362				79,362	267	534	78,828	39,414
MONTANA	2,363	132,151	87,533		222,047	164	328	221,719	110,860
NEW MEXICO	10,948	50,801		6	61,755	123	246	61,509	30,754
NORTH CAROLINA	112				112	1	2	110	55
NORTH DAKOTA			350,910		350,910	77	154	350,756	175,378
Ohio	86,584				86,584	1,806	3,612	82,972	41,486
Oklahoma	54,951				54,951	166	332	54,619	27,309
PENNSYLVANIA	75,093			22,805	97,898	12,761	25,522	72,376	36,189
SOUTH DAKOTA			2,033		2,033	1	2	2,031	1,015
Tennessee	25,665				25,665	340	680	24,985	12,493
Texas	8,000		23,000		31,000	62	124	30,876	15,438
Utah	88,184	5,156			93,340	218	436	92,904	46,452
VIRGINIA	11,696			355	12,051	609	1,218	10,833	5,417
Washington	11,413	52,442		23	63,878	145	290	63,588	31,794

WEST VIRGINIA	116,618				116,618	5,428	10,856	105,762	52,881
WYOMING	13,235	[9] 108,319	(9)		121,554	383	766	120,788	60,395
Other States	[10] 820	[11] 15,500	[12] 50		16,370	9	18	16,352	8,176
Total	1,093,740	373,806	463,616	24,132	1,955,294	[13] 27,785	55,555	1,899,739	949,870

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*Averitt, Paul, Berryhill, Louise R., and Taylor, Dorothy A., Coal Resources of the United States: Geol. Survey Circ. 293, 1954, p. 5.

[1] Production, 1800–85, from Eavenson, H. N., The First Century and a Quarter of American Coal Industry, Pittsburgh, 1942, pp. 432–434; production, 1886–1952, from Geol. Survey Mineral Resources volumes and Bureau of Mines Minerals Yearbooks unless otherwise indicated.

[2] Reserve estimates of States in lower case letters were prepared by, or under the direction of, M. R. Campbell before 1928.

[3] Reserve estimates of States in capital letters supersede earlier estimates by M. R. Campbell.

[4] Remaining reserves, January 1, 1950.

[5] Production, 1950–52.

[6] See discussion in text.

[7] Production, 1860–1949, Michigan Geological Survey Division, as cited in Cohee, G. V., Burns, R. N., Brown, Andrew, Brant, R. A., and Wright, Dorothy, Coal Resources of Michigan: Geol. Survey Circ. 77, 1950, p. 56.

[8] Past losses assumed to be 40 percent of coal originally in the ground.

[9] Small reserves and production of lignite included under subbituminous coal.

[10] Includes Arizona, California, Idaho, and Oregon.

[11] Includes Arizona, California, and Oregon.

[12] Includes California and Louisiana.

[13] Somewhat less than total recorded production. See footnote 5.

THICKNESS OF BITUMINOUS-COAL AND LIGNITE SEAMS

The Bureau of Mines compiled and published detailed data on thickness of seams for coal mines in 1955.[1] Because of the importance of seam thickness in mining operations, these data follow.

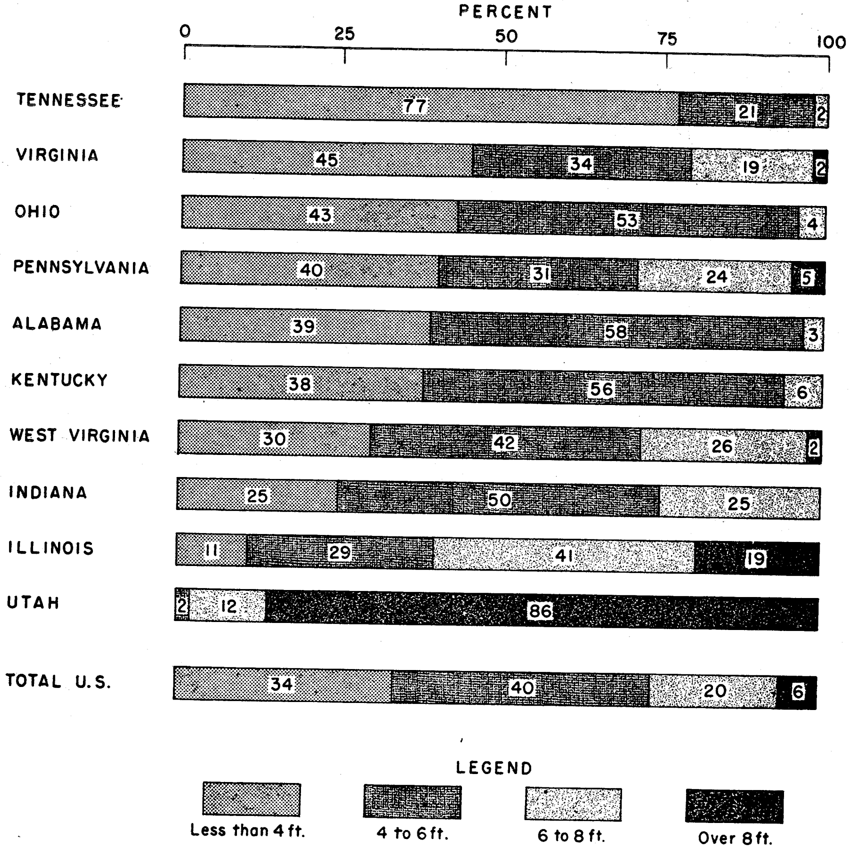

FIGURE 1.—Percentage of bituminous coal and lignite produced in the 10 leading coal-producing States and total United States, 1955, by thickness of seams mined.

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[1] Young, W. H., and Anderson, R. L., Thickness of Bituminous-Coal and Lignite Seams at All Mines, and Thickness of Overburden at Strip Mines in the United States in 1955: Bureau of Mines Inf. Circ. 7812, 1957, 11 pp.

TABLE 3.—Number and production of bituminous-coal and lignite mines in the United States, 1955, classified by thickness of seams mined

Item	Less than 2 feet	2 to 3 feet	3 to 4 feet	4 to 5 feet	5 to 6 feet	6 to 7 feet	7 to 8 feet	8 feet and over	Total
Number of mines:									
Underground	32	1,289	2,467	1,243	438	251	152	163	6,035
Strip	117	484	503	267	113	47	23	63	1,617
Auger	--------	35	78	67	14	7	--------	3	204
Total	149	1,808	3,048	1,577	565	305	175	229	7,856
Percentage of mines:									
Underground	.5	21.4	40.9	20.6	7.2	4.2	2.5	2.7	100.0
Strip	7.2	30.0	31.1	16.5	7.0	2.9	1.4	3.9	100.0
Auger	--------	17.2	38.2	32.8	6.9	3.4	--------	1.5	100.0
Total	1.9	23.0	38.8	20.1	7.2	3.9	2.2	2.9	100.0
Production (thousand tons):									
Underground	269	17,610	81,934	69,650	65,621	50,397	35,107	22,877	343,465
Strip	4,232	19,303	31,516	29,016	17,579	5,923	1,077	6,447	115,093
Auger	--------	423	1,627	2,774	661	525	--------	65	6,075
Total	4,501	37,336	115,077	101,440	83,861	56,845	36,184	29,389	464,633
Percentage of production:									
Underground	.1	5.1	23.9	20.2	19.1	14.7	10.2	6.7	100.0
Strip	3.7	16.8	27.4	25.2	15.2	5.2	.9	5.6	100.0
Auger	--------	7.0	26.8	45.7	10.9	8.6	--------	1.0	100.0
Total	1.0	8.0	24.8	21.8	18.1	12.2	7.8	6.3	100.0

TABLE 4.—Number of mines, production, output per man per day, and average thickness of seams mined, at underground, strip, and auger bituminous-coal and lignite mines in the United States, by States, in 1955

State	Underground mines				Strip mines				Auger mines				Total, all mines			
	Number of mines	Production (net tons)	Average output per man per day (tons)	Average thickness of seams mined (feet)	Number of mines	Production (net tons)	Average output per man per day (tons)	Average thickness of seams mined (feet)	Number of mines	Production (net tons)	Average output per man per day (tons)	Average thickness of seams mined (feet)	Number of mines	Production (net tons)	Average output per man per day (tons)	Average thickness of seams mined (feet)
Alabama	195	10, 970, 610	6. 25	4. 4	39	2, 110, 979	14. 64	3. 2	1	6, 888	20. 00	8. 0	235	13, 088, 477	6. 89	4. 6
Alaska	6	239, 571	5. 64	20. 7	7	400, 125	16. 94	23. 7					13	639, 696	9. 68	22. 6
Arizona	2	8, 898	2. 78	5. 5									2	8, 898	2. 78	5. 5
Arkansas	19	317, 001	4. 36	2. 6	8	260, 725	11. 65	1. 7					27	577, 726	6. 08	2. 2
California (lignite)					1	7, 650	15. 30	8. 0					1	7, 650	15. 30	8. 0
Colorado	110	3, 211, 125	5. 84	7. 1	7	356, 805	24. 41	6. 2					117	3, 567, 930	6. 32	7. 0
Georgia	6	12, 471	2. 70	1. 5									6	12, 471	2. 70	1. 5
Illinois	103	27, 256, 495	14. 23	7. 3	68	18, 675, 619	23. 87	4. 8					171	45, 932, 114	17. 02	6. 3
Indiana	44	4, 967, 089	10. 66	6. 2	56	11, 182, 221	27. 14	4. 4					100	16, 149, 310	18. 39	5. 0
Iowa	30	297, 490	4. 33	4. 5	30	960, 867	16. 35	3. 9					60	1, 258, 357	9. 87	4. 1
Kansas	5	14, 819	3. 17	2. 7	19	727, 463	11. 97	1. 6					24	742, 282	11. 34	1. 6
Kentucky	1, 852	54, 440, 144	8. 38	4. 4	118	13, 643, 240	25. 36	4. 8	34	936, 526	19. 17	4. 4	2, 004	69, 019, 910	9. 75	4. 4
Maryland	58	275, 454	3. 82	3. 8	26	237, 015	12. 22	4. 7					84	512, 469	5. 60	4. 2
Missouri	19	157, 103	2. 99	3. 6	28	3, 075, 382	20. 69	2. 5					47	3, 232, 485	16. 06	2. 6
Montana (bituminous and lignite)	19	439, 285	7. 95	5. 8	5	807, 968	67. 25	23. 5					24	1, 247, 253	18. 54	17. 3
New Mexico	28	174, 299	3. 86	5. 8	3	27, 280	14. 44	6. 3					31	201, 579	4. 28	5. 9
North Dakota (lignite)	5	21, 357	7. 99	10. 1	40	3, 080, 730	35. 90	12. 1					45	3, 102, 087	35. 06	12. 1
Ohio	233	12, 632, 165	8. 47	4. 8	259	23, 958, 329	22. 83	3. 8	38	1, 279, 297	35. 38	4. 1	530	37, 869, 791	14. 70	4. 2
Oklahoma	14	694, 323	4. 57	3. 7	21	1, 469, 213	17. 75	2. 3					35	2, 163, 536	9. 22	2. 8
Pennsylvania	797	64, 904, 231	7. 19	5. 5	585	20, 518, 113	14. 99	3. 2	29	291, 112	13. 50	3. 0	1, 411	85, 713, 456	8. 23	4. 9
South Dakota (lignite)					2	25, 782	10. 31	4. 5					2	25, 782	10. 31	4. 5
Tennessee	409	5, 340, 664	5. 72	3. 9	87	1, 635, 052	16. 72	2. 5	8	77, 128	11. 62	3. 3	504	7, 052, 844	6. 79	3. 6
Utah	50	6, 295, 524	9. 75	11. 1									50	6, 295, 524	9. 75	11. 1
Virginia	1, 007	22, 241, 262	7. 19	4. 5	31	981, 782	13. 78	5. 0	21	284, 465	14. 06	4. 5	1, 059	23, 507, 509	7. 38	4. 5
Washington	12	578, 076	5. 01	7. 6	1	31, 714	25. 66	5. 5					13	609, 790	5. 24	7. 5
West Virginia	996	126, 588, 262	8. 86	5. 1	168	9, 379, 643	22. 96	5. 8	73	3, 199, 984	22. 92	4. 7	1, 237	139, 167, 889	9. 38	5. 1
Wyoming	16	1, 387, 521	9. 35	8. 0	8	1, 539, 072	36. 32	33. 1					24	2, 926, 593	15. 34	21. 2
Total	6, 035	343, 465, 239	8. 28	5. 3	1, 617	115, 092, 769	21. 12	4. 9	204	6, 075, 400	22. 22	4. 4	7, 856	464, 633, 408	9. 84	5. 2

DOMESTIC PRODUCTION

TABLE 5.—Growth of the bituminous-coal- and lignite-mining industry in the United States, 1890–1957

Year	Production (net tons)	Value of production		Number of mines	Capacity at 280 days (million tons)	Foreign trade [1]	
		Total	Average per ton			Exports (net tons)	Imports (net tons)
1890	111,302,322	$110,420,801	$0.99	(2)	137	1,272,396	1,047,416
1891	117,901,238	117,188,400	.99	(2)	148	1,651,694	1,181,677
1892	126,856,567	125,124,381	.99	(2)	162	1,904,556	1,491,800
1893	128,385,231	122,751,618	.96	(2)	174	1,986,383	1,234,499
1894	118,820,405	107,653,501	.91	(2)	196	2,439,720	1,286,268
1895	135,118,193	115,779,771	.86	2,555	196	2,659,987	1,411,323
1896	137,640,276	114,891,515	.83	2,599	202	2,515,838	1,393,095
1897	147,617,519	119,595,224	.81	2,454	213	2,670,157	1,442,534
1898	166,593.623	132,608,713	.80	2,862	221	3,004,304	1,426,108
1899	193,323,187	167,952,104	.87	3,245	230	3,897,994	1,409,838
1900	212,316,112	220,930,313	1.04	(2)	255	6,060,688	1,911,925
1901	225,828,149	236,422,049	1.05	(2)	281	6,455,085	2,214,507
1902	260,216,844	290,858,483	1.12	(2)	316	6,048,777	2,174,393
1903	282,749,348	351,687,933	1.24	(2)	350	5,835,561	4,043,519
1904	278,659,689	305,397,001	1.10	4,650	386	7,206,879	2,179,882
1905	315,062,785	334,658,294	1.06	5,060	417	7,512,723	1,704,810
1906	342,874,867	381,162,115	1.11	4,430	451	8,014,263	2,039,169
1907	394,759,112	451,214,842	1.14	4,550	473	9,869,812	1,892,653
1908	332,573,944	374,135,268	1.12	4,730	482	11,071,152	2,219,243
1909	379,744,257	405,486,777	1.07	5,775	510	10,101,131	1,375,201
1910	417,111,142	469,281,719	1.12	5,818	538	11,663,052	1,819,766
1911	405,907,059	451,375,819	1.11	5,887	538	13,259,791	1,972,555
1912	450,104,982	517,983,445	1.15	5,747	566	16,475,029	1,456,333
1913	478,435,297	565,234,952	1.18	5,776	577	18,013,073	1,767,656
1914	422,703,970	493,309,244	1.17	5,592	608	17,589,562	1,520,962
1915	442,624,426	502,037,688	1.13	5,502	610	18,776,640	1,703,785
1916	502,519,682	665,116,077	1.32	5,726	613	21,254,627	1,713,837
1917	551,790,563	1,249,272,837	2.26	6,939	636	23,839,558	1,448,453
1918	579,385,820	1,491,809,940	2.58	8,319	650	22,350,730	1,457,073
1919	465,860,058	1,160,616,013	2.49	8,994	669	20,113,536	1,011,550
1920	568,666,683	2,129,933,000	3.75	8,921	725	38,517,084	1,244,990
1921	415,921,950	1,199,983,600	2.89	8,038	781	23,131,166	1,257,589
1922	422,268,099	1,274,820,000	3.02	9,299	832	12,413,085	5,059,999
1923	564,564,662	1,514,621,000	2.68	9,331	885	21,453,579	1,882,306
1924	483,686,538	1,062,626,000	2.20	7,586	792	17,100,347	417,226
1925	520,052,741	1,060,402,000	2.04	7,144	748	17,461,560	601,737
1926	573,366,985	1,183,412,000	2.06	7,177	747	35,271,937	485,666
1927	517,763,352	1,029,657,000	1.99	7,011	759	18,011,744	549,843
1928	500,744,970	933,774,000	1.86	6,450	691	16,164,485	546,526
1929	534,988,593	952,781,000	1.78	6,057	679	17,429,298	495,219
1930	467,526,299	795,483,000	1.70	5,891	700	15,877,407	240,886
1931	382,089,396	588,895,000	1.54	5,642	669	12,126,299	206,303
1932	309,709,872	406,677,000	1.31	5,427	594	8,814,047	186,909
1933	333,630,533	445,788,000	1.34	5,555	559	9,036,947	197,429
1934	359,368,022	628,383,000	1.75	6,258	565	10,868,552	179,661
1935	372,373,122	658,063,000	1.77	6,315	582	9,742,430	201,871
1936	439,087,903	770,955,000	1.76	6,875	618	10,654,959	271,798
1937	445,531,449	864,042,000	1.94	6,548	646	13,144,678	257,996
1938	348,544,764	678,653,000	1.95	5,777	602	10,490,269	241,305
1939	394,855,325	728,348,366	1.84	5,820	621	11,590,478	355,115
1940	460,771,500	879,327,227	1.91	6,324	639	16,465,928	371,571
1941	514,149,245	1,125,362,836	2.19	6,822	666	20,740,471	390,049
1942	582,692,937	1,373,990,608	2.36	6,972	663	22,943,305	498,103
1943	590,177,069	1,584,644,477	2.69	6,620	626	25,836,208	757,634
1944	619,576,240	1,810,900,542	2.92	6,928	624	26,032,348	633,689
1945	577,617,327	1,768,204,320	3.06	7,033	620	27,956,192	467,473
1946	533,922,068	1,835,539,476	3.44	7,333	699	41,197,378	434,680
1947	630,623,722	2,622,634,946	4.16	8,700	755	68,666,963	290,141
1948	599,518,229	2,993,267,021	4.99	9,079	774	45,930,133	291,337
1949	437,868,036	2,136,870,571	4.88	8,559	781	27,842,056	314,980
1950	516,311,053	2,500,373,779	4.84	9,429	790	25,468,403	346,706
1951	533,664,732	2,626,030,137	4.92	8,009	736	56,721,547	292,378
1952	466,840,782	2,289,180,401	4.90	7,275	703	47,643,150	262,268
1953	457,290,449	2,247,828,694	4.92	6.671	670	33,760,263	226,900
1954	391,706,300	1,769,619,723	4.52	6,130	603	31,040,564	198,799
1955	464,633,408	2,092,382,737	4.50	7,856	620	51,277,256	337,145
1956	500,874,077	2,412,004,151	4.82	8,520	655	68,552,629	355,701
1957	492,703,916	2,508,314,127	5.08	8,539	680	76,342,312	366,506

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[1] Figures for 1890-1914 represent fiscal year ended June 30.

[2] Data not available.

TABLE 6.—Growth of the bituminous-coal- and lignite-mining industry in the United States, 1890–1957

Year	Men employed	Average number of days worked	Average days lost per man on strike	Net tons per man—		Percentage of underground production—		Percentage of total production—	
				Per day	Per year	Cut by machines[1]	Mechanically loaded	Mechanically cleaned[2]	Mined by stripping
1890	192,204	226	(3)	2.56	579	(3)	(3)	(3)	(3)
1891	205,803	223	(3)	2.57	573	5.3	(3)	(3)	(3)
1892	212,893	219	(3)	2.72	596	(2)	(3)	(3)	(3)
1893	230,365	204	(3)	2.73	557	(3)	(3)	(3)	(3)
1894	244,603	171	(3)	2.84	486	(3)	(3)	(3)	(3)
1895	239,962	194	(3)	2.90	563	(3)	(3)	(3)	(3)
1896	244,171	192	(3)	2.94	564	11.9	(3)	(3)	(3)
1897	247,817	196	(3)	3.04	596	15.3	(3)	(3)	(3)
1898	255,717	211	(3)	3.09	651	19.5	(3)	(4)	(3)
1899	271,027	234	46	3.05	713	22.7	(3)	(3)	(3)
1900	304,375	234	43	2.98	697	24.9	(3)	(3)	(3)
1901	340,235	225	35	2.94	664	25.6	(3)	(3)	(3)
1902	370,056	230	44	3.06	703	26.8	(3)	(3)	(3)
1903	415,777	225	28	3.02	680	27.6	(3)	(3)	(3)
1904	437,832	202	44	3.15	637	28.2	(3)	(3)	(3)
1905	460,629	211	23	3.24	684	32.8	(3)	(3)	(3)
1906	478,425	213	63	3.36	717	34.7	(3)	2.7	(3)
1907	513,258	234	14	3.29	769	35.1	(3)	2.9	(3)
1908	516,264	193	38	3.34	644	37.0	(3)	3.6	(3)
1909	543,152	209	29	3.34	699	37.5	(3)	3.8	(3)
1910	555,533	217	89	3.46	751	41.7	(2)	3.8	(3)
1911	549,775	211	27	3.50	738	43.9	(3)	(3)	(3)
1912	548,632	223	35	3.68	820	46.8	(3)	3.9	(3)
1913	571,882	232	36	3.61	837	50.7	(3)	4.6	(3)
1914	583,506	195	80	3.71	724	51.8	(3)	4.8	0.3
1915	557,456	203	61	3.91	794	55.3	(3)	4.7	.6
1916	561,102	230	26	3.90	896	56.9	(3)	4.6	.8
1917	603,143	243	17	3.77	915	56.1	(3)	4.6	1.0
1918	615,305	249	7	3.78	942	56.7	(3)	3.8	1.4
1919	621,998	195	37	3.84	749	60.0	(3)	3.6	1.2
1920	639,547	220	22	4.00	881	60.7	(3)	3.3	1.5
1921	663,754	149	23	4.20	627	66.4	(3)	3.4	1.2
1922	687,958	142	117	4.28	609	64.8	(3)	(3)	2.4
1923	704,793	179	20	4.47	801	68.3	0.3	3.8	2.1
1924	619,604	171	73	4.56	781	71.5	.7	(3)	2.8
1925	588,493	195	30	4.52	884	72.9	1.2	(3)	3.2
1926	593,647	215	24	4.50	966	73.8	1.9	(3)	3.0
1927	593,918	191	153	4.55	872	74.9	3.3	5.3	3.6
1928	522,150	203	83	4.73	959	76.9	4.5	5.7	4.0
1929	502,993	219	11	4.85	1,064	78.4	7.4	6.9	3.8
1930	493,202	187	43	5.06	948	81.0	10.5	8.3	4.3
1931	450,213	160	35	5.30	849	83.2	13.1	9.5	5.0
1932	406,380	146	120	5.22	762	84.1	12.3	9.8	6.3
1933	418,703	167	30	4.78	797	84.7	12.0	10.4	5.5
1934	458,011	178	15	4.40	785	84.1	12.2	11.1	5.8
1935	462,403	179	[4] 7	4.50	805	84.2	13.5	12.2	6.4
1936	477,204	199	21	4.62	920	84.8	16.3	13.9	6.4
1937	491,864	193	[4] 19	4.69	906	(3)	20.2	14.6	7.1
1938	441,333	162	13	4.89	790	87.5	26.7	18.2	8.7
1939	421,788	178	36	5.25	936	87.9	31.0	20.1	9.6
1940	439,075	202	8	5.19	1,049	88.4	35.4	22.2	9.2
1941	456,981	216	27	5.20	1,125	89.0	40.7	22.9	10.7
1942	461,991	246	7	5.12	1,261	89.7	45.2	24.4	11.5
1943	416,007	264	[4] 15	5.38	1,419	90.3	48.9	24.7	13.5
1944	393,347	278	[4] 5	5.67	1,575	90.5	52.9	25.6	16.3
1945	383,100	261	[4] 9	5.78	1,508	90.8	56.1	25.6	19.0
1946	[5] 396,434	214	[4] 23	6.30	1,347	90.8	58.4	26.0	21.1
1947	[5] 419,182	234	[4] 5	6.42	1,504	90.0	60.7	27.7	22.1
1948	[5] 441,631	217	[4] 16	6.26	1,358	90.7	64.3	30.2	23.3
1949	[5] 433,698	157	[4] 15	6.43	1,010	91.4	67.0	35.1	24.2
1950	[5] 415,582	183	[4] 56	6.77	1,239	91.8	69.4	38.5	23.9
1951	[5] 372,897	203	[4] 4	7.04	1,429	93.4	73.1	45.0	22.0
1952	[5] 335,217	186	[4] 6	7.47	1,389	92.8	75.6	48.7	23.3
1953	[5] 293,106	191	[4] 3	8.17	1,560	92.3	79.6	52.9	23.1
1954	[5] 227,397	182	[4] 4	9.47	1,724	88.8	84.0	59.4	25.1
1955	[5] 225,093	210	[4] 4	9.84	2,064	88.1	84.6	58.7	24.8
1956	[5] 228,163	214	[4] 4	10.28	2,195	84.6	84.0	58.4	25.4
1957	[5] 228,635	203	[4] 3	10.59	2,155	80.9	84.8	61.7	25.2

[1] Percentages for 1890–1913 are of total production, as a separation of underground and strip production is not available for these years.

[2] Percentages for 1906–26 are exclusive of coal cleaned at central washeries operated by consumers.

[3] Data not available.

[4] Bureau of Labor Statistics, U. S. Department of Labor.

[5] Average number of men working daily.

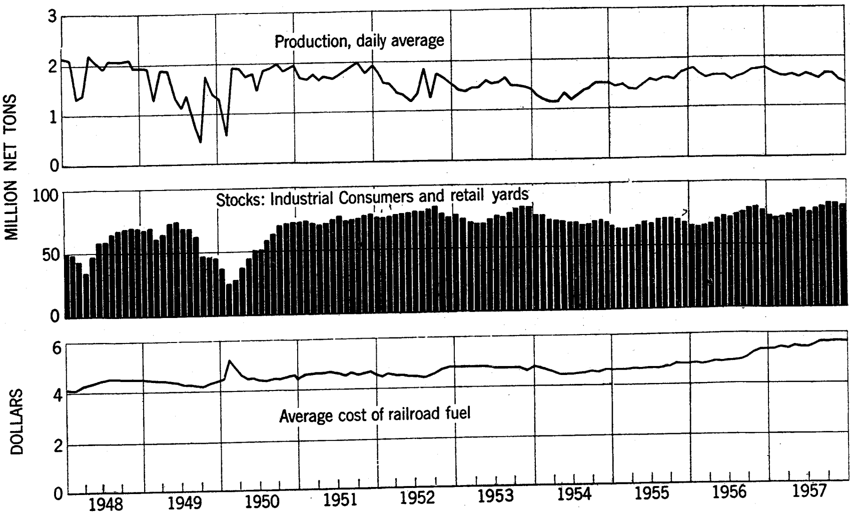

FIGURE 2.—Trends of production, stocks, and railroad-fuel prices of bituminous coal and lignite in the United States, 1948–57.

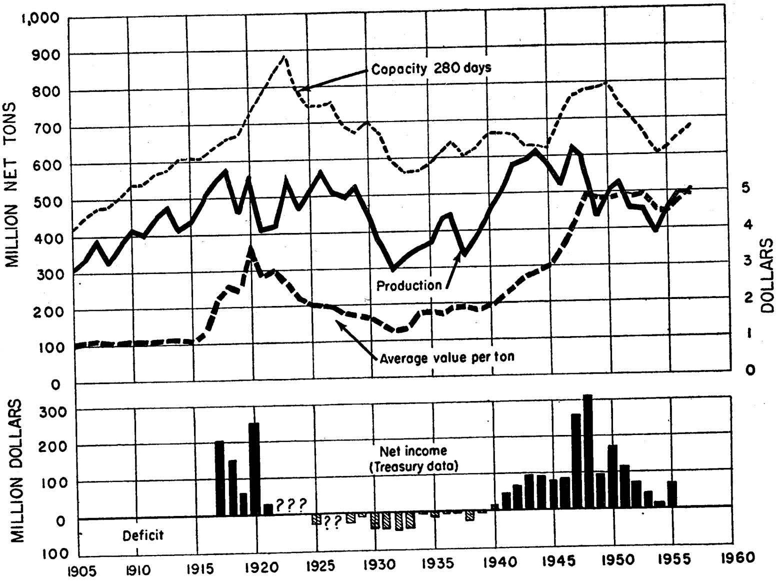

FIGURE 3.—Trends of bituminous-coal and lignite production, realization, mine capacity, and net income or deficit in the United States, 1905–57.

PRODUCTION BY MONTHS AND WEEKS

The figures on monthly and weekly production are estimates based upon (1) railroad carloadings of coal reported daily and weekly by all important carriers, (2) shipments on the Allegheny and Monongahela Rivers reported by the United States Army Engineers, (3) direct reports from mining companies, and (4) monthly production statements compiled by certain local operators' associations and State mine departments. In computing the estimates, allowance is made for commercial truck shipments, local sales, colliery fuel, and small truck mines producing over 1,000 tons a year. Preliminary estimates are made currently and published in the Weekly Coal Reports. These preliminary estimates have proved very reliable and for many years have been within approximately 1 percent of the final figure of total production, based upon complete coverage of all mines producing over 1,000 tons a year. The preliminary estimates are revised later to agree with the final total production based on the canvass. Thus, the monthly and weekly estimates of production, summarized in tables 6–9, represent final figures and vary slightly from the preliminary figures of production published in the Weekly Coal Reports.

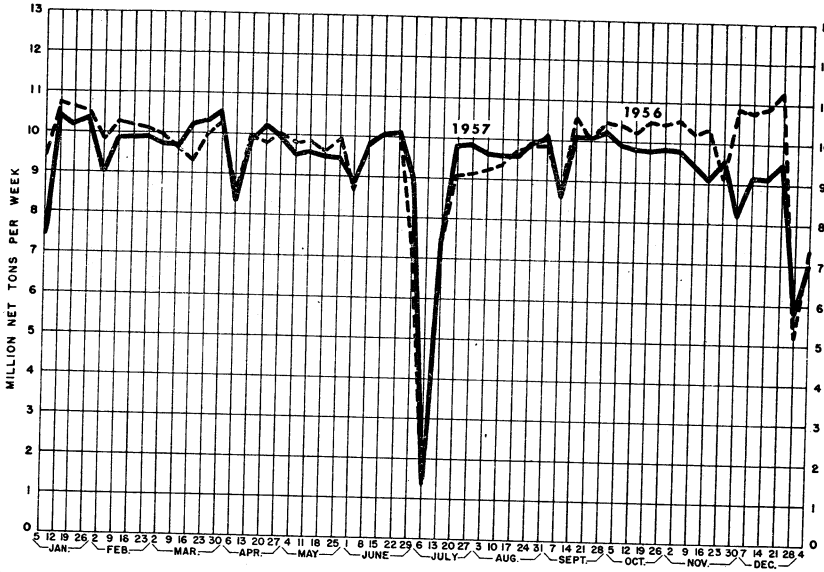

FIGURE 4.—Production of bituminous coal and lignite in the United States, 1956–57, by weeks.

TABLE 7.—Production of bituminous coal and lignite in the United States, 1956–57, with estimates by months

Month	Production (thousand net tons)		Maximum number of working days		Average production per working day (thousand net tons)	
	1956	1957	1956	1957	1956	1957
January	45,215	44,668	25	26	1,809	1,718
February	42,334	39,884	25	24	1,693	1,662
March	43,331	43,030	27	26	1,605	1,655
April	40,183	42,245	24.2	25.2	1,660	1,676
May	43,968	43,161	26.5	26.5	1,659	1,629
June	39,283	39,551	23.5	23.3	1,672	1,697
July	30,642	34,484	19.9	21	1,540	1,642
August	43,986	43,300	27	27	1,629	1,604
September	40,246	40,981	24	24	1,677	1,708
October	47,909	45,729	27	27	1,774	1,694
November	44,282	38,508	24.8	24.7	1,786	1,559
December	39,495	37,163	22	25	1,795	1,487
Total	500,874	492,704	295.9	299.7	1,693	1,644

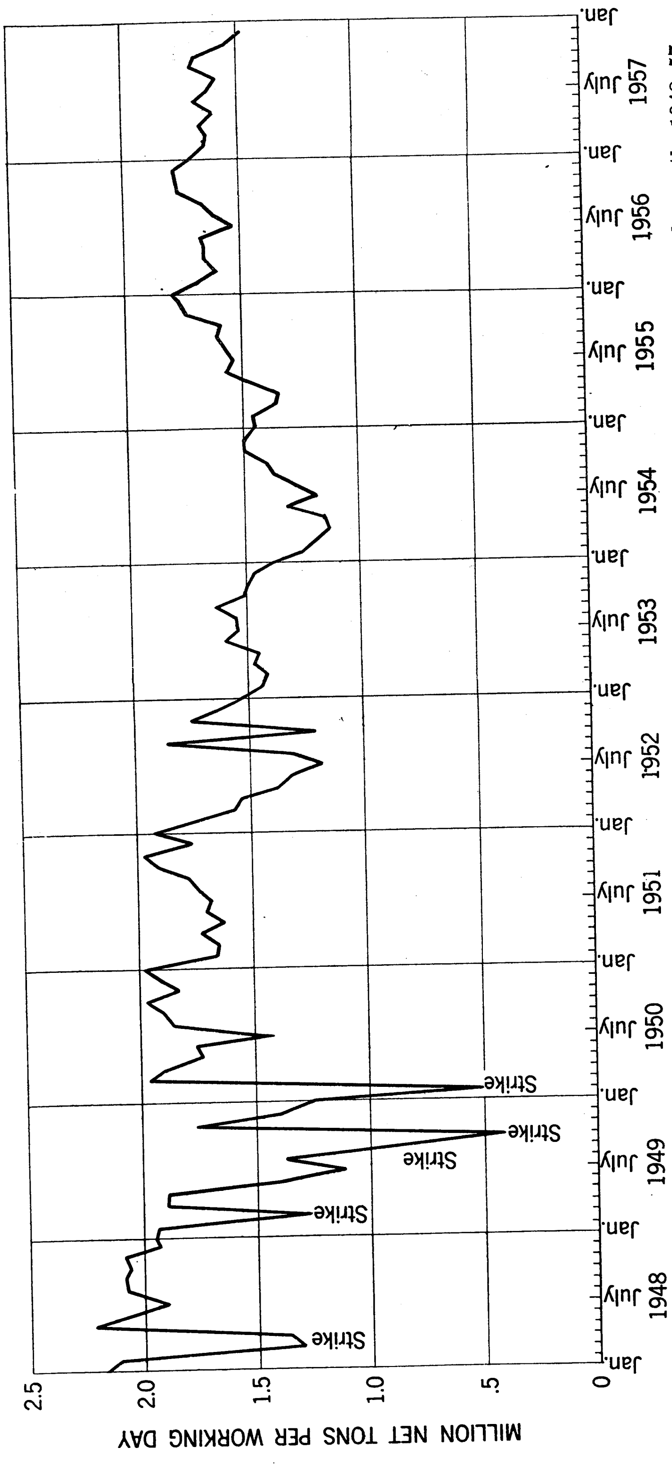

FIGURE 5.—Average production of bituminous coal and lignite in the United States per working day in each month, 1948–57.

TABLE 8.—Production of bituminous coal and lignite in the United States in 1957, by States, with estimates by months, in thousand net tons

[Totals for year are based on final complete returns from all operators known to have produced 1,000 or more tons per year. In most instances monthly apportionment is based on current records of railroad carloadings and shipments on the Allegheny and Monongahela Rivers, supplemented by direct reports from local sources]

State	January	February	March	April	May	June	July	August	September	October	November	December	Total
Alabama	1, 189	1, 030	1, 081	1, 119	1, 246	1, 109	911	1, 172	1, 094	1, 234	1, 020	1, 055	13, 260
Alaska	92	70	77	58	40	23	75	77	84	94	79	73	842
Arkansas	50	42	43	35	43	43	29	38	49	56	43	37	508
Colorado	471	316	300	253	215	214	171	227	313	391	350	373	3, 594
Illinois	4, 758	3, 998	3, 901	3, 808	3, 732	3, 548	2, 770	3, 692	3, 864	4, 448	4, 224	4, 250	46, 993
Indiana	1, 696	1, 527	1, 430	1, 306	1, 110	1, 075	963	1, 167	1, 195	1, 423	1, 421	1, 528	15, 841
Iowa	154	134	128	101	89	74	84	83	92	119	110	144	1, 312
Kansas	85	77	74	51	46	52	45	58	52	54	67	88	749
Kentucky:													
Eastern	3, 609	3, 417	3, 945	3, 919	4, 108	3, 757	3, 344	4, 182	3, 909	4, 415	3, 645	3, 412	45, 662
Western	2, 757	2, 240	2, 309	2, 397	2, 385	2, 276	2, 148	2, 593	2, 480	2, 711	2, 286	2, 423	29, 005
Total Kentucky	6, 366	5, 657	6, 254	6, 316	6, 493	6, 033	5, 492	6, 775	6, 389	7, 126	5, 931	5, 835	74, 667
Maryland	58	51	52	53	61	58	51	66	75	81	73	69	748
Missouri	334	289	272	229	218	219	198	236	199	242	270	270	2, 976
Montana:													
Bituminous	56	46	49	47	28	24	15	12	13	27	37	33	387
Lignite	3	3	2	2	2	2	1	1	2	3	2	3	26
Total Montana	59	49	51	49	30	26	16	13	15	30	39	36	413
New Mexico	20	13	11	11	10	10	13	9	7	12	9	12	137
North Dakota (lignite)	340	268	250	168	116	91	96	117	153	294	332	336	2, 561
Ohio	2, 870	2, 574	3, 148	3, 465	3, 507	3, 323	2, 979	3, 287	3, 257	3, 583	2, 570	2, 299	36, 862
Oklahoma	216	207	215	154	189	166	155	188	167	204	155	179	2, 195
Pennsylvania	8, 389	7, 511	7, 770	7, 328	7, 421	6, 657	5, 741	7, 461	7, 019	7, 661	6, 265	6, 142	85, 365
South Dakota (lignite)	2	2	2	2	1	1	2	1	2	2	2	2	21
Tennessee	679	642	699	593	649	594	655	835	713	766	598	532	7, 955
Utah	778	673	580	542	487	451	368	607	568	672	590	542	6, 858
Virginia	2, 257	2, 073	2, 547	2, 577	2, 729	2, 432	2, 351	2, 775	2, 507	2, 802	2, 301	2, 155	29, 506
Washington	50	43	46	41	18	31	4	17	18	35	34	23	360
West Virginia	13, 448	12, 434	13, 922	13, 835	14, 600	13, 214	11, 232	14, 211	12, 964	14, 174	11, 833	10, 975	156, 842
Wyoming	305	202	175	149	109	106	82	187	183	224	190	205	2, 117
Other States [1]	2	2	2	2	2	1	1	1	2	2	2	3	22
Total	44, 668	39, 884	43, 030	42, 245	43, 161	39, 551	34, 484	43, 300	40, 981	45, 729	38, 508	37, 163	492, 704

[1] Includes Arizona and Georgia.

TABLE 9.—Production of bituminous coal and lignite in the United States in 1957, by districts, with estimates by months, in thousand net tons

[Totals for year are based on final complete returns from all operators known to have produced 1,000 or more tons per year. In most instances monthly apportionment is based on current records of railroad carloadings and shipments on the Allegheny and Monongahela Rivers, supplemented by direct reports from local sources]

District	January	February	March	April	May	June	July	August	September	October	November	December	Total
1. Eastern Pennsylvania	3, 771	3, 373	3, 492	3, 301	3, 348	3, 008	2, 594	3, 368	3, 184	3, 473	2, 848	2, 791	38, 551
2. Western Pennsylvania	4, 722	4, 228	4, 374	4, 125	4, 178	3, 747	3, 232	4, 200	3, 951	4, 312	3, 527	3, 457	48, 053
3. Northern West Virginia	4, 429	3, 737	4, 189	4, 303	4, 196	3, 841	3, 304	3, 989	3, 900	4, 199	3, 570	3, 586	47, 243
4. Ohio	2, 870	2, 574	3, 148	3, 465	3, 507	3, 323	2, 979	3, 287	3, 257	3, 583	2, 570	2, 299	36, 862
5. Michigan	------	------	------	------	------	------	------	------	------	------	------	------	------
6. Panhandle	300	254	284	292	285	261	224	271	265	285	242	243	3, 206
7. Southern Numbered 1	4, 173	3, 976	4, 564	4, 462	4, 827	4, 308	3, 660	4, 742	4, 182	4, 663	3, 871	3, 398	50, 826
8. Southern Numbered 2	10, 826	10, 354	11, 807	11, 631	12, 525	11, 355	10, 149	12, 691	11. 476	12, 720	10, 465	9, 639	135, 638
9. West Kentucky	2, 757	2, 240	2, 309	2, 397	2, 385	2, 276	2, 148	2, 593	2, 480	2, 711	2, 286	2, 423	29, 005
10. Illinois	4, 758	3, 998	3, 901	3, 808	3, 732	3, 548	2, 770	3, 692	3, 864	4, 448	4, 224	4, 250	46, 993
11. Indiana	1, 696	1, 527	1, 430	1, 306	1, 110	1, 075	963	1, 167	1, 195	1, 423	1, 421	1, 528	15, 841
12. Iowa	154	134	128	101	89	74	84	83	92	119	110	144	1, 312
13. Southeastern	1, 409	1, 237	1, 307	1, 311	1, 456	1, 302	1, 123	1, 442	1, 324	1, 482	1, 213	1, 228	15, 834
14. Arkansas-Oklahoma	155	144	148	110	135	125	104	129	131	156	118	125	1, 580
15. Southwestern	530	471	456	359	361	355	323	391	336	400	417	449	4, 848
16. Northern Colorado	124	68	67	46	25	18	8	24	42	73	83	87	665
17. Southern Colorado	353	253	237	211	194	200	168	206	274	322	270	289	2, 977
18. New Mexico	15	9	8	8	7	6	8	6	5	9	7	10	98
19. Wyoming	305	202	175	149	109	106	82	187	183	224	190	205	2, 117
20. Utah	778	673	580	542	487	451	368	607	568	672	590	542	6, 858
21. North-South Dakota	342	270	252	170	117	92	98	118	155	296	334	338	2, 582
22. Montana	59	49	51	49	30	26	16	13	15	30	39	36	413
23. Washington	142	113	123	99	58	54	79	94	102	129	113	96	1, 202
Total	44, 668	39, 884	43, 030	42, 245	43, 161	39, 551	34, 484	43, 300	40, 981	45, 729	38, 508	37 163	492, 704

TABLE 10.—Production of bituminous coal and lignite in the United States, 1956–57, with estimates by weeks

1956				1957			
Week ended—	Production (thousand net tons)	Maximum number of working days	Average production per working day (thousand net tons)	Week ended—	Production (thousand net tons)	Maximum number of working days	Average production per working day (thousand net tons)
Jan. 7	9,385	5	1,877	Jan. 5	[1] 6,641	[1] 4	[2] 1,854
Jan. 14	10,759	6	1,793	Jan. 12	10,497	6	1,750
Jan 21	10,652	6	1,775	Jan. 19	10,179	6	1,697
Jan. 28	10,528	6	1,755	Jan. 26	10,426	6	1,738
Feb. 4	9,852	6	1,642	Feb. 2	9,040	6	1,507
Feb. 11	10,276	6	1,713	Feb. 9	9,926	6	1,654
Feb. 18	10,173	6	1,696	Feb. 16	9,922	6	1,654
Feb. 25	10,098	6	1,683	Feb. 23	10,031	6	1,672
Mar. 3	9,979	6	1,663	Mar. 2	9,810	6	1,635
Mar. 10	9,578	6	1,596	Mar. 9	9,758	6	1,626
Mar. 17	9,289	6	1,548	Mar. 16	10,294	6	1,716
Mar. 24	9,985	6	1,664	Mar. 23	10,412	6	1,735
Mar. 31	10,326	6	1,721	Mar. 30	10,646	6	1,774
Apr. 7	8,518	5.2	1,638	Apr. 6	8,356	5.2	1,607
Apr. 14	9,955	6	1,659	Apr. 13	9,934	6	1,656
Apr. 21	9,803	6	1,634	Apr. 20	10,238	6	1,706
Apr. 28	10,058	6	1,676	Apr. 27	10,031	6	1,672
May 5	9,845	6	1,641	May 4	9,568	6	1,595
May 12	9,873	6	1,646	May 11	9,661	6	1,610
May 19	9,667	6	1,611	May 18	9,578	6	1,596
May 26	9,961	6	1,660	May 25	9,530	6	1,588
June 2	8,557	5.5	1,556	June 1	8,879	5.5	1,614
June 9	9,707	6	1,618	June 8	9,866	6	1,644
June 16	10,132	6	1,689	June 15	10,184	6	1,697
June 23	10,150	6	1,692	June 22	10,239	6	1,707
June 30	7,208	3.5	2,059	June 29	8,893	4.3	2,068
July 7	1,324	.7	1,891	July 6	1,481	.8	1,851
July 14	7,337	5.2	1,411	July 13	7,508	5.2	1,444
July 21	9,082	6	1,514	July 20	9,856	6	1,643
July 28	9,129	6	1,522	July 27	9,907	6	1,651
Aug. 4	9,222	6	1,537	Aug. 3	9,698	6	1,616
Aug. 11	9,395	6	1,566	Aug. 10	9,643	6	1,607
Aug. 18	9,779	6	1,630	Aug. 17	9,625	6	1,604
Aug. 25	9,850	6	1,642	Aug. 24	9,978	6	1,663
Sept. 1	9,891	6	1,649	Aug. 31	10,088	6	1,681
Sept. 8	8,712	5	1,742	Sept. 7	8,628	5	1,726
Sept. 15	10,613	6	1,769	Sept. 14	10,149	6	1,692
Sept. 22	10,061	6	1,677	Sept. 21	10,119	6	1,687
Sept. 29	10,479	6	1,747	Sept. 28	10,306	6	1,718
Oct. 6	10,409	6	1,735	Oct. 5	9,991	6	1,665
Oct. 13	10,232	6	1,705	Oct. 12	9,941	6	1,657
Oct. 20	10,540	6	1,757	Oct. 19	9,862	6	1,644
Oct. 27	10,442	6	1,740	Oct. 26	9,913	6	1,652
Nov. 3	10,560	6	1,760	Nov. 2	9,866	6	1,644
Nov. 10	10,218	6	1,703	Nov. 9	9,519	6	1,587
Nov. 17	10,338	5.8	1,782	Nov. 16	9,147	5.7	1,605
Nov. 24	9,088	5	1,818	Nov. 23	9,593	6	1,599
Dec. 1	10,888	6	1,815	Nov. 30	8,184	5	1,637
Dec. 8	10,794	6	1,799	Dec. 7	9,230	6	1,538
Dec. 15	10,860	6	1,810	Dec. 14	9,171	6	1,529
Dec. 22	11,360	6	1,893	Dec. 21	9,610	6	1,602
Dec. 29	5,183	3	1,728	Dec. 28	5,843	5	1,169
Jan. 5	[1] 774	(1)	[2] 1,854	Jan. 4	[1] 3,309	[1] 2	[2] 1,405
Total	500,874	295.9	1.693	Total	492,704	299.7	1,644

[1] Figures represent output and number of working days in that part of week included in calendar year shown. Total production for the week ended Jan. 5, 1957, was 7,415,000 net tons, and for Jan. 4, 1958, 7,025,000 net tons.

[2] Average daily output for the entire week and not for working days in the calendar year shown.

SUMMARY BY STATES

TABLE 11.—Bituminous coal and lignite produced in the United States, by States, 1948–57, with production of maximum year and cumulative production from earliest record to end of 1957, in thousand net tons

State	Maximum production		Production, by years										Total production from earliest record to end of 1957
	Year	Quantity	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	
Alabama	1926	21, 001	18, 801	12, 934	14, 422	13, 597	11, 383	12, 532	10, 282	13, 088	12, 663	13, 260	923, 505
Arkansas	1907	2, 670	1, 662	962	1, 169	1, 107	873	775	477	578	590	508	97, 453
Colorado	1917	12, 483	5, 631	4, 636	4, 259	4, 103	3, 623	3, 575	2, 900	3, 568	3, 502	3, 594	500, 245
Illinois	1918	89, 291	65, 342	47, 208	56, 291	54, 200	45, 790	46, 010	41, 971	45, 932	48, 102	46, 993	3, 516, 572
Indiana	1918	30, 679	23, 849	16, 550	19, 957	19, 451	16, 350	15, 812	13, 400	16, 149	17, 089	15, 841	1, 119, 337
Iowa	1917	8, 966	1, 670	1, 725	1, 891	1, 630	1, 381	1, 388	1, 197	1, 258	1, 358	1, 312	349, 148
Kansas	1918	7, 562	2, 538	2, 031	2, 125	1, 961	2, 029	1, 715	1, 372	742	884	749	277, 628
Kentucky	1947	84, 241	82, 084	62, 583	78, 495	74, 972	66, 114	65, 060	56, 964	69, 020	74, 555	74, 667	2, 515, 621
Maryland	1907	5, 533	1, 661	668	648	589	588	530	422	512	669	748	264, 531
Missouri	1917	5, 671	4, 023	3, 647	2, 963	3, 269	2, 955	2, 393	2, 514	3, 232	3, 283	2, 976	281, 053
Montana	1944	4, 844	2, 898	2, 766	2, 520	2, 345	2, 070	1, 873	1, 491	1, 247	846	413	170, 068
New Mexico	1918	4, 023	1, 364	1, 004	727	783	760	514	123	201	158	137	124, 843
North Dakota	1950	3, 261	2, 961	2, 967	3, 261	3, 224	2, 984	2, 803	(1)	3, 102	2, 815	2, 561	[2] 88, 390
Ohio	1920	45, 878	38, 708	30, 961	37, 761	37, 949	36, 209	34, 737	32, 469	37, 870	38, 934	36, 862	1, 990, 473
Oklahoma	1920	4, 849	3, 462	3, 022	2, 679	2, 223	2, 193	2, 168	1, 915	2, 164	2, 007	2, 195	176, 319
Pennsylvania	1918	178, 551	134, 542	89, 215	105, 870	108, 164	89, 181	93, 331	72, 010	85, 713	90, 287	85, 365	8, 095, 712
Tennessee	1956	8, 848	6, 483	4, 172	5, 070	5, 401	5, 265	5, 467	6, 429	7, 053	8, 848	7, 955	375, 800
Utah	1947	7, 429	6, 813	6, 160	6, 670	6, 136	6, 140	6, 544	5, 008	6, 296	6, 522	6, 858	248, 040
Virginia	1957	29, 506	17, 999	14, 584	17, 667	21, 400	21, 579	19, 119	16, 387	23, 508	28, 063	29, 506	731, 352
Washington	1918	4, 082	1, 220	899	874	857	844	690	619	610	473	360	147, 776
West Virginia	1947	176, 157	168, 862	122, 610	144, 116	163, 310	141, 713	134, 105	115, 996	139, 168	155, 891	156, 842	6, 112, 884
Wyoming	1945	9, 847	6, 412	6, 001	6, 348	6, 430	6, 088	5, 245	2, 831	2, 927	2, 553	2, 117	398, 000
Other States [3]	--------	----------	533	563	528	564	729	904	4, 929	695	782	885	183, 279
Total	1947	630, 624	599, 518	437, 868	516, 311	533, 665	466, 841	457, 290	391, 706	464, 633	500, 874	492, 704	28, 688, 029

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[1] North Dakota included in "Other States" in 1954 to avoid disclosing individual operations.

[2] Excludes production of North Dakota in 1954 to avoid disclosing individual operations.

[3] Production, if any, in Alaska, Arizona, California, Georgia, Idaho, Michigan, North Carolina, Oregon, South Dakota, or Texas included in "Other States."

TABLE 12.—Number of mines, production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States

State	Number of active mines	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
		Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
Alabama	171	10, 654, 125	1, 024, 956	1, 580, 421	13, 259, 502	$6. 49	8, 546	204	1, 743, 173	7. 61
Alaska	10	834, 715	3, 945	3, 678	842, 338	8. 66	333	228	75, 780	11. 12
Arizona	2	----------	8, 795	106	8, 901	7. 02	33	107	3, 531	2. 52
Arkansas	25	496, 627	11, 079	25	507, 731	7. 83	705	137	96, 840	5. 24
Colorado	107	2, 748, 036	787, 180	58, 413	3, 593, 629	6. 08	2, 852	196	557, 848	6. 44
Georgia	4	----------	13, 464	----------	13, 464	4. 65	17	246	4, 168	3. 23
Illinois	172	41, 221, 691	5, 527, 095	244, 239	46, 993, 025	4. 00	12, 459	205	2, 551, 203	18. 42
Indiana	90	13, 460, 269	1, 716, 955	664, 064	15, 841, 288	3. 92	3, 861	209	807, 769	19. 61
Iowa	63	789, 897	521, 030	748	1, 311, 675	3. 46	644	182	117, 198	11. 19
Kansas	17	642, 152	106, 744	105	749, 001	4. 45	292	186	54, 283	13. 80
Kentucky	2, 167	67, 936, 877	6, 627, 404	102, 515	74, 666, 796	4. 53	38, 043	179	6, 814, 518	10. 96
Maryland	83	427, 968	320, 299	31	748, 298	4. 12	701	158	110, 410	6. 78
Missouri	43	2, 564, 986	409, 109	1, 627	2, 975, 722	4. 26	971	203	197, 138	15. 09
Montana:										
Bituminous	17	326, 240	57, 866	3, 223	387, 329	5. 33	237	170	40, 281	9. 62
Lignite	10	----------	25, 530	42	25, 572	3. 80	32	115	3, 685	6. 94
Total Montana	27	326, 240	83, 396	3, 265	412, 901	5. 23	269	163	43, 966	9. 39
New Mexico	26	58, 405	78, 088	658	137, 151	6. 05	188	218	41, 057	3. 34
North Dakota (lignite)	38	1, 900, 748	351, 957	307, 947	2, 560, 652	2. 32	366	195	71, 260	35. 93
Ohio	470	24, 182, 282	10, 873, 356	1, 805, 969	36, 861, 607	3. 96	10, 496	226	2, 366, 933	15. 57
Oklahoma	30	2, 082, 105	112, 509	645	2, 195, 259	6. 45	1, 040	212	220, 456	9. 96
Pennsylvania	1, 616	69, 723, 888	12, 081, 671	3, 559, 695	85, 365, 254	5. 77	46, 262	208	9, 645, 348	8. 85
South Dakota (lignite)	1	----------	21, 018	100	21, 118	3. 75	10	240	2, 397	8. 81
Tennessee	491	5, 638, 842	2, 310, 161	6, 085	7, 955, 088	3. 92	8, 229	122	1, 005, 087	7. 91
Utah	48	6, 228, 125	352, 574	277, 598	6, 858, 297	5. 87	2, 990	223	667, 747	10. 27
Virginia	1, 208	26, 030, 307	3, 080, 825	394, 447	29, 505, 579	5. 22	16, 764	210	3, 525, 776	8. 37
Washington	10	277, 921	75, 422	6, 993	360, 336	7. 66	344	203	69, 687	5. 17
West Virginia	1, 601	151, 490, 372	3, 696, 133	1, 655, 533	156, 842, 038	5. 58	71, 201	219	15, 599, 330	10. 05
Wyoming	19	1, 925, 450	138, 642	53, 174	2, 117, 266	3. 67	1, 019	126	127, 939	16. 55
Total	8, 539	431, 642, 028	50, 333, 807	10, 728, 081	492, 703, 916	5. 08	228, 635	203	46, 520, 842	10. 59

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[1] Includes coal loaded at mines directly into railroad cars or river barges, hauled by trucks to railroad sidings, and hauled by trucks to waterways.

[2] Includes coal transported from mines to point of use by conveyor belts or trams, used by mine employees, taken by locomotive tenders at tipples, used at mines for power and heat, made into beehive coke at mines, and all other uses at mines.

[3] Value received or charged for coal, f. o. b. mines. Includes a value, estimated by producer, for coal not sold.

TABLE 13.—Number of mines, production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by districts

District	Number of active mines	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
		Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
1. Eastern Pennsylvania	1,214	31,483,856	5,407,583	1,659,873	38,551,312	$5.25	22,302	205	4,573,444	8.43
2. Western Pennsylvania	503	39,098,986	7,054,085	1,899,869	48,052,940	6.22	24,861	210	5,223,703	9.20
3. Northern West Virginia	499	45,505,590	1,556,241	181,140	47,242,971	5.05	18,526	211	3,893,199	12.13
4. Ohio	470	24,182,282	10,873,356	1,805,969	36,861,607	3.96	10,496	226	2,366,933	15.57
5. Michigan										
6. Panhandle	20	1,928,653	504,542	772,703	3,205,898	4.62	1,404	213	299,670	10.70
7. Southern Numbered 1	929	48,950,561	1,431,758	444,055	50,826,374	6.60	27,886	221	6,150,748	8.26
8. Southern Numbered 2	3,663	124,614,514	10,282,250	740,999	135,637,763	5.12	76,089	195	14,841,313	9.14
9. West Kentucky	140	27,426,264	1,561,237	17,499	29,005,000	3.54	7,442	187	1,391,844	20.84
10. Illinois	172	41,221,691	5,527,095	244,239	46,993,025	4.00	12,459	205	2,551,203	18.42
11. Indiana	90	13,460,269	1,716,955	664,064	15,841,288	3.92	3,861	209	807,769	19.61
12. Iowa	63	789,897	521,030	748	1,311,675	3.46	644	182	117,198	11.19
13. Southeastern	373	12,893,955	1,357,217	1,582,589	15,833,761	6.13	11,253	184	2,073,889	7.63
14. Arkansas-Oklahoma	42	1,563,323	16,515	125	1,579,963	7.08	1,066	166	176,547	8.95
15. Southwestern	73	4,222,547	622,926	2,277	4,847,750	4.74	1,942	202	392,170	12.36
16. Northern Colorado	8	381,089	273,642	10,458	665,189	4.62	344	181	62,253	10.69
17. Southern Colorado	107	2,393,009	535,844	47,983	2,976,836	6.40	2,592	199	514,953	5.78
18. New Mexico	20	32,343	64,577	736	97,656	6.51	137	184	25,230	3.87
19. Wyoming	19	1,925,450	138,642	53,174	2,117,266	3.67	1,019	126	127,939	16.55
20. Utah	48	6,228,125	352,574	277,598	6,858,297	5.87	2,990	223	667,747	10.27
21. North-South Dakota	39	1,900,748	372,975	308,047	2,581,770	2.33	376	196	73,657	35.05
22. Montana	27	326,240	83,396	3,265	412,901	5.23	269	163	43,966	9.39
23. Washington	20	1,112,636	79,367	10,671	1,202,674	8.36	677	215	145,467	8.27
Total	8,539	431,642,028	50,333,807	10,728,081	492,703,916	5.08	228,635	203	46,520,842	10.59

[1] Includes coal loaded at mines directly into railroad cars or river barges, hauled by trucks to railroad sidings, and hauled by trucks to waterways.

[2] Includes coal transported from mines to point of use by conveyor belts or trams, used by mine employees, taken by locomotive tenders at tipples, used at mines for power and heat, made into beehive coke at mines, and all other uses at mines.

[3] Value received or charged for coal, f. o. b. mines. Includes a value, estimated by producer, for coal not sold.

NUMBER AND SIZE OF MINES

The unit in the statistical record is the mine, and operating companies are requested to make a separate report for each mine because its location is definitely known and can be related to a specific district or county; its identity can be followed through successive changes of

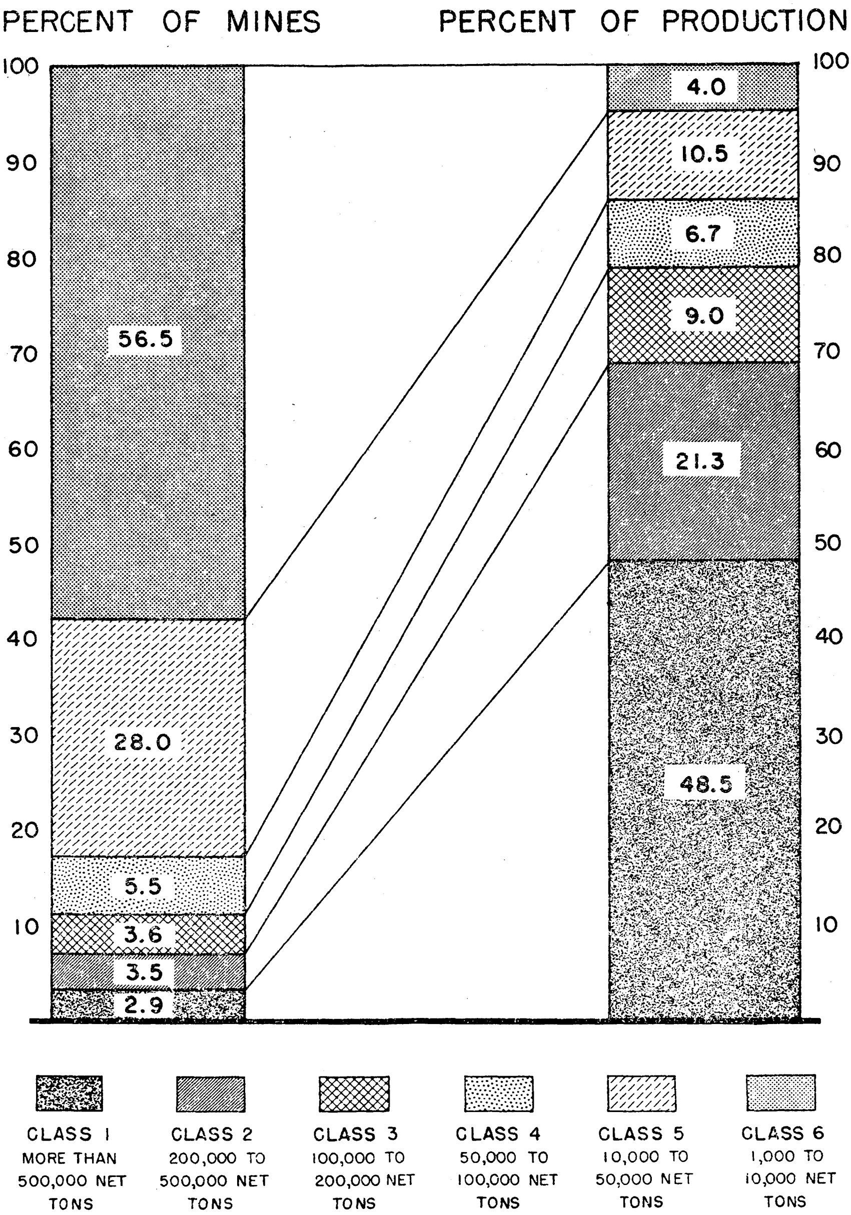

FIGURE 6.—Percentage of number of mines and of production of bituminous-coal and lignite mines in the United States, 1957, by size of output.

TABLE 14.—Number and production of bituminous-coal and lignite mines in the United States, 1957, by States and size of output

State	Class 1—500,000 tons and over				Class 2—200,000 to 500,000 tons				Class 3—100,000 to 200,000 tons			
	Mines		Production		Mines		Production		Mines		Production	
	Number	Percentage	Net tons	Percentage	Number	Percentage	Net tons	Percentage	Number	Percentage	Net tons	Percentage
Alabama	8	4.7	7,781,121	58.7	6	3.5	2,060,933	15.5	12	7.0	1,727,223	13.0
Alaska					2	20.0	448,212	53.2				
Arizona												
Arkansas									1	4.0	124,026	24.4
Colorado	1	.9	838,804	23.3	2	1.9	676,458	18.8	5	4.7	679,516	18.9
Georgia												
Illinois	37	21.5	33,420,371	71.1	12	7.0	9,591,881	20.4	13	7.5	1,873,226	4.0
Indiana	9	10.0	8,890,463	56.1	15	16.7	5,400,241	34.1	4	4.4	468,246	2.9
Iowa					1	1.6	320,159	24.4				
Kansas					1	5.9	487,918	65.2				
Kentucky	34	1.6	33,205,306	44.5	41	1.9	13,304,527	17.8	44	2.0	6,047,161	8.1
Maryland												
Missouri	2	4.7	1,122,523	37.7	5	11.6	1,390,412	46.7	1	2.3	145,430	4.9
Montana (bituminous and lignite)									2	7.4	295,271	71.5
New Mexico												
North Dakota (lignite)					6	15.8	1,969,437	76.9	1	2.6	195,217	7.6
Ohio	18	3.8	18,432,567	50.0	16	3.4	4,580,574	12.4	38	8.1	5,524,766	15.0
Oklahoma					3	10.0	848,094	38.6	5	16.7	758,744	34.6
Pennsylvania	42	2.6	41,547,606	48.7	46	2.8	15,627,530	18.3	54	3.3	7,932,689	9.3
South Dakota (lignite)												
Tennessee					7	1.4	2,436,277	30.6	11	2.2	1,348,907	17.0
Utah	5	10.4	2,908,394	42.4	6	12.5	2,148,678	31.3	5	10.4	868,507	12.7
Virginia	10	.8	9,449,981	32.0	12	1.0	4,041,175	13.7	17	1.4	2,463,623	8.3
Washington					1	10.0	205,522	57.0				
West Virginia	78	4.9	80,514,520	51.3	118	7.4	38,320,654	24.4	97	6.0	14,040,336	9.0
Wyoming	1	5.3	577,139	27.3	3	15.8	1,119,805	52.9	1	5.2	69,609	3.3
Total	245	2.9	238,688,795	48.5	303	3.5	104,978,487	21.3	311	3.6	44,562,497	9.0

TABLE 14.—Number and production of bituminous-coal and lignite mines in the United States, 1957, by States and size of output—Con.

State	Class 4—50,000 to 100,000 tons				Class 5—10,000 to 50,000 tons				Class 6—less than 10,000 tons				Total		
	Mines		Production		Mines		Production		Mines		Production		Mines	Production (net tons)	
	Number	Percentage	Net tons	Percentage	Number	Percentage	Net tons	Percentage	Number	Percentage	Net tons	Percentage		Total	Average per mine
Alabama	10	5.8	673,151	5.1	23	13.5	571,456	4.3	112	65.5	445,618	3.4	171	13,259,502	77,541
Alaska	4	40.0	253,854	30.2	3	30.0	139,296	16.5	1	10.0	976	.1	10	842,338	84,234
Arizona									2	100.0	8,901	100.0	2	8,901	4,451
Arkansas	2	8.0	171,781	33.9	10	40.0	178,820	35.2	12	48.0	33,104	6.5	25	507,731	20,309
Colorado	9	8.4	639,129	17.8	26	24.3	559,700	15.6	64	59.8	200,022	5.6	107	3,593,629	33,585
Georgia									4	100.0	13,464	100.0	4	13,464	3,366
Illinois	9	5.2	668,821	1.4	50	29.1	1,224,248	2.6	51	29.7	214,478	.5	172	46,993,025	273,215
Indiana	6	6.7	438,693	2.8	19	21.1	469,879	3.0	37	41.1	173,766	1.1	90	15,841,288	176,014
Iowa	5	7.9	366,992	28.0	19	30.2	445,605	34.4	38	60.3	178,919	13.6	63	1,311,675	20,820
Kansas	2	11.7	146,862	19.6	3	17.7	74,251	9.9	11	64.7	39,970	5.3	17	749,001	44,059
Kentucky	79	3.6	5,657,750	7.6	489	22.6	10,569,804	14.1	1,480	68.3	5,882,248	7.9	2,167	74,666,796	34,456
Maryland	1	1.2	72,198	9.6	20	24.1	456,090	61.0	62	74.7	220,010	29.4	83	748,298	9,016
Missouri	2	4.7	141,424	4.8	4	9.3	78,802	2.6	29	67.4	97,131	3.3	43	2,975,722	69,203
Montana (bituminous and lignite)					1	3.7	32,874	8.0	24	88.9	84,756	88.9	27	412,901	15,293
New Mexico					5	19.2	79,912	58.3	21	80.8	57,239	41.7	26	137,151	5,275
North Dakota (lignite)	2	5.3	126,409	4.9	10	26.3	190,746	7.5	19	50.0	78,843	3.1	38	2,560,652	67,386
Ohio	53	11.3	3,683,347	10.0	153	32.6	3,779,614	10.3	192	40.8	860,739	2.3	470	36,861,607	78,429
Oklahoma	6	20.0	394,573	18.0	6	20.0	162,386	7.4	10	33.3	31,462	1.4	30	2,195,259	73,175
Pennsylvania	98	6.1	6,899,955	8.1	425	26.3	9,762,828	11.4	951	58.9	3,594,646	4.2	1,616	85,365,254	52,825
South Dakota (lignite)					1	100.0	21,118	100.0					1	21,118	21,118
Tennessee	14	2.9	1,051,591	13.2	83	16.9	1,882,685	23.7	376	76.6	1,235,628	15.5	491	7,955,088	16,202
Utah	6	12.5	456,895	6.7	18	37.5	454,645	6.6	8	16.7	21,178	.3	48	6,858,297	142,881
Virginia	22	1.8	1,433,547	4.9	536	44.4	9,074,401	30.8	611	50.6	3,042,852	10.3	1,208	29,505,579	24,425
Washington					6	60.0	147,726	41.0	3	30.0	7,088	2.0	10	360,336	36,034
West Virginia	133	8.3	9,654,449	6.2	480	30.0	11,298,004	7.2	695	43.4	3,014,075	1.9	1,601	156,842,038	97,965
Wyoming	3	15.8	212,967	10.0	3	15.8	99,576	4.7	8	42.1	38,170	1.8	19	2,117,266	111,435
Total	466	5.5	33,144,388	6.7	2,393	28.0	51,754,466	10.5	4,821	56.5	19,575,283	4.0	8,539	492,703,916	57,700

ownership; and it is the natural operating unit from the standpoint of cost, mechanical equipment, mining practice, and output per man per day.

EMPLOYMENT AND PRODUCTIVITY

The bituminous-coal and lignite industry has become highly mechanized in recent years. Mechanization has strongly affected production per man per day and the number of employees. In the past 20 years productivity has virtually doubled, and the number of employees declined 50 percent.

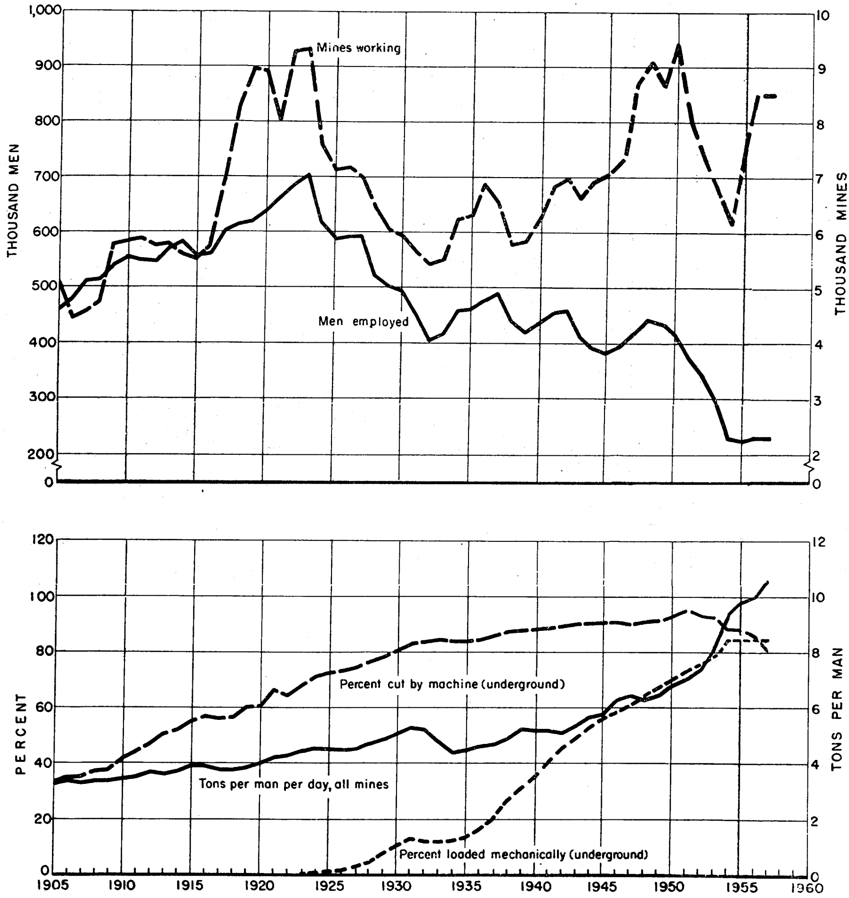

FIGURE 7.—Trends of employment, mechanization, and output per man at bituminous-coal and lignite mines in the United States, 1905–57.

TABLE 15.—Production and average output per man per day of bituminous-coal and lignite mines in the United States, 1957, by States and by underground, strip, and auger mining

State	Production (net tons)				Percentage of total production				Average tons per man per day			
	Underground	Strip	Auger	Total	Underground	Strip	Auger	Total	Underground	Strip	Auger	Total
Alabama	11, 078, 296	2, 172, 307	8, 899	13, 259, 502	83. 5	16. 4	0. 1	100. 0	6. 85	17. 27	23. 86	7. 61
Alaska	297, 744	544, 594	----------	842, 338	35. 3	64. 7	----------	100. 0	6. 55	17. 96	----------	11. 12
Arizona	8, 901	----------	----------	8, 901	100. 0	----------	----------	100. 0	2. 52	----------	----------	2. 52
Arkansas	286, 875	220, 856	----------	507, 731	56. 5	43. 5	----------	100. 0	4. 19	7. 77	----------	5. 24
Colorado	3, 230, 497	363, 132	----------	3, 593, 629	89. 9	10. 1	----------	100. 0	5. 96	23. 05	----------	6. 44
Georgia	13, 464	----------	----------	13, 464	100. 0	----------	----------	100. 0	3. 23	----------	----------	3. 23
Illinois	26, 993, 681	19, 999, 344	----------	46, 993, 025	57. 4	42. 6	----------	100. 0	15. 37	25. 15	----------	18. 42
Indiana	4, 950, 046	10, 891, 242	----------	15, 841, 288	31. 2	68. 8	----------	100. 0	11. 65	28. 44	----------	19. 61
Iowa	273, 189	1, 038, 486	----------	1, 311, 675	20. 8	79. 2	----------	100. 0	4. 42	18. 76	----------	11. 19
Kansas	11, 324	737, 677	----------	749, 001	1. 5	98. 5	----------	100. 0	2. 51	14. 82	----------	13. 80
Kentucky	55, 514, 126	17, 612, 792	1, 539, 878	74, 666, 796	74. 3	23. 6	2. 1	100. 0	8. 96	31. 29	26. 77	10. 96
Maryland	325, 734	422, 564	----------	748, 298	43. 5	56. 5	----------	100. 0	3. 72	18. 40	----------	6. 78
Missouri	100, 885	2, 874, 837	----------	2, 975, 722	3. 4	96. 6	----------	100. 0	3. 11	17. 45	----------	15. 09
Montana:												
Bituminous	221, 218	166, 111	----------	387, 329	57. 1	42. 9	----------	100. 0	6. 72	22. 58	----------	9. 62
Lignite	16, 382	9, 190	----------	25, 572	64. 1	35. 9	----------	100. 0	6. 70	7. 41	----------	6. 94
Total Montana	237, 600	175, 301	----------	412, 901	57. 5	42. 5	----------	100. 0	6. 72	20. 39	----------	9. 39
New Mexico	122, 416	14, 735	----------	137, 151	89. 3	10. 7	----------	100. 0	3. 14	7. 23	----------	3. 34
North Dakota (lignite)	4, 018	2, 556, 634	----------	2, 560, 652	. 2	99. 8	----------	100. 0	5. 48	36. 25	----------	35. 93
Ohio	11, 764, 050	23, 956, 629	1, 140, 928	36, 861, 607	31. 9	65. 0	3. 1	100. 0	9. 73	21. 58	23. 54	15. 57
Oklahoma	440, 010	1, 755, 249	----------	2, 195, 259	20. 0	80. 0	----------	100. 0	3. 80	16. 76	----------	9. 96
Pennsylvania	63, 777, 927	21, 220, 728	366, 599	85, 365, 254	74. 7	24. 9	. 4	100. 0	7. 70	15. 84	19. 92	8. 85
South Dakota (lignite)	----------	21, 118	----------	21, 118	----------	100. 0	----------	100. 0	----------	8. 81	----------	8. 81
Tennessee	5, 045, 501	2, 614, 528	295, 059	7, 955, 088	63. 4	32. 9	3. 7	100. 0	5. 93	17. 81	39. 59	7. 91
Utah	6, 858, 297	----------	----------	6, 858, 297	100. 0	----------	----------	100. 0	10. 27	----------	----------	10. 27
Virginia	27, 061, 116	1, 867, 982	576, 481	29, 505, 579	91. 7	6. 3	2. 0	100. 0	7. 95	20. 73	19. 01	8. 37
Washington	343, 461	16, 875	----------	360, 336	95. 3	4. 7	----------	100. 0	4. 97	26. 91	----------	5. 17
West Virginia	141, 260, 224	11, 563, 421	4, 018, 393	156, 842, 038	90. 0	7. 4	2. 6	100. 0	9. 49	20. 16	28. 53	10. 05
Wyoming	649, 759	1, 467, 507	----------	2, 117, 266	30. 7	69. 3	----------	100. 0	8. 51	28. 45	----------	16. 55
Total	360, 649, 141	124, 108, 538	7, 946, 237	492, 703, 916	73. 2	25. 2	1. 6	100. 0	8. 91	21. 64	26. 19	10. 59

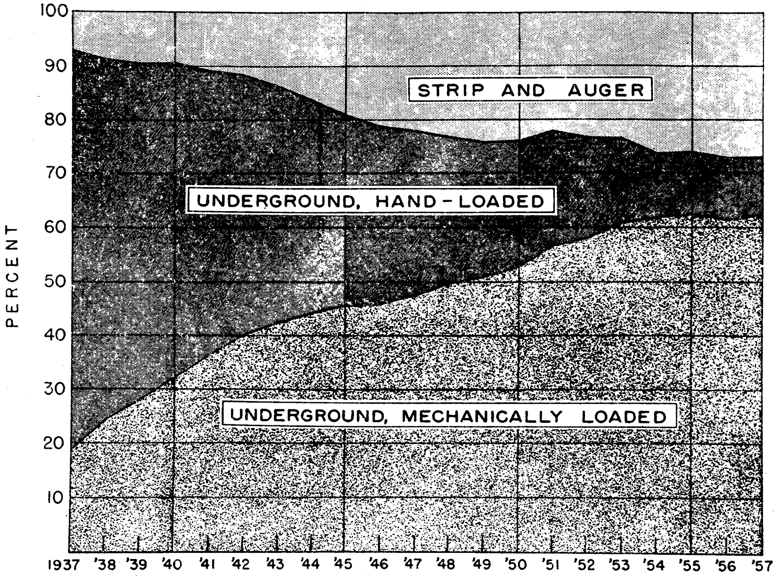

FIGURE 8.—Percentage of total production of bituminous coal and lignite in the United States, 1937–57, by type of mining and loading.

UNDERGROUND MINING

Three-fourths of the output of bituminous coal and lignite is mined underground. The major tasks underground are cutting, drilling shot holes, loading, and haulage. Loading is discussed later in the section on Mechanical Loading. For many years most of the underground production has been cut by machine. The use of power drills for shot holes has increased rapidly in the past 15 years; 82 percent of the underground production in 1957 came from mines using power drills. Trolley locomotives are the principal method of underground haulage; however, in recent years the use of conveyor haulage has steadily increased.

TABLE 16.—Underground production of bituminous coal and lignite in the United States, 1957, by States and mining methods

State	Cut by hand and shot from solid		Cut by machines				Mined by continuous mining machines		Total underground (net tons)
	Net tons	Percentage of total underground	Net tons	Percentage of total underground	Number of coal-cutting machines	Average output per machine (net tons)	Net tons	Percentage of total underground	
Alabama	349,191	3.1	9,504,109	85.8	216	44,001	1,224,996	11.1	11,078,296
Alaska	284,879	95.7					12,865	4.3	297,744
Arizona	4,206	47.2	4,695	52.8	1	4,695			8,901
Arkansas	8,616	3.0	247,359	86.2	37	6,685	30,900	10.8	286,875
Colorado	717,541	22.2	2,322,812	71.9	268	8,667	190,144	5.9	3,230,497
Georgia	7,464	55.4	6,000	44.6	1	6,000			13,464
Illinois	30,603	.1	21,085,304	78.1	202	104,383	5,877,774	21.8	26,993,681
Indiana	3,045		4,665,927	94.3	99	47,131	281,074	5.7	4,950,046
Iowa	84,056	30.8	189,133	69.2	25	7,565			273,189
Kansas			11,324	100.0	4	2,831			11,324
Kentucky	3,832,209	6.9	49,361,413	88.9	1,627	30,339	2,320,504	4.2	55,514,126
Maryland	114,825	35.3	210,909	64.7	32	6,591			325,734
Missouri			100,885	100.0	19	5,310			100,885
Montana:									
Bituminous	3,017	1.4	218,201	98.6	24	9,092			221,218
Lignite	16,382	100.0							16,382
Total Montana	19,399	8.2	218,201	91.8	24	9,092			237,600
New Mexico	38,580	31.5	83,836	68.5	14	5,988			122,416
North Dakota (lignite)	2,836	70.6	1,182	29.4	1	1,182			4,018
Ohio	58,002	.5	8,371,236	71.2	288	29,067	3,334,812	28.3	11,764,050
Oklahoma	6,177	1.4	433,833	98.6	59	7,353			440,010
Pennsylvania	1,287,818	2.0	41,386,508	64.9	1,731	23,909	21,103,601	33.1	63,777,927
Tennessee	791,371	15.7	4,254,130	84.3	241	17,652			5,045,501
Utah	6,136	.1	5,860,778	85.5	131	44,739	991,383	14.4	6,858,297
Virginia	3,975,836	14.7	21,582,775	79.8	984	21,934	1,502,505	5.5	27,061,116
Washington	186,937	54.4	18,500	5.4	2	9,250	138,024	40.2	343,461
West Virginia	3,413,046	2.4	121,115,068	85.7	2,679	45,209	16,732,110	11.9	141,260,224
Wyoming	3,902	.6	603,639	92.9	132	4,573	42,218	6.5	649,759
Total	15,226,675	4.2	291,639,556	80.9	8,817	33,077	53,782,910	14.9	360,649,141

TABLE 17.—Use of power drills in underground bituminous-coal and lignite mines in the United States, 1957, by States

State	Number of mines using power drills	Number of power drills				Production in working places where shot holes are power-drilled (net tons)			
		Face or coal drills		Roof or rock drills					
		Hand-held and post-mounted	Mobile	Rotary	Percussion	Hand-held and post-mounted drills	Mobile drills	Total	Percentage of total underground
Alabama	77	363	------	31	99	9,690,376	----------	9,690,376	87.5
Alaska	3	33	------	------	------	248,264	----------	248,264	83.4
Arizona	1	1	------	------	------	4,695	----------	4,695	52.7
Arkansas	8	18	------	2	4	257,337	----------	257,337	89.7
Colorado	80	301	18	14	93	2,797,049	198,374	2,995,423	92.7
Georgia	1	1	------	------	------	6,000	----------	6,000	44.6
Illinois	75	116	152	115	2	2,101,196	19,165,958	21,267,154	78.8
Indiana	37	51	56	28	------	820,142	3,837,580	4,657,722	94.1
Iowa	19	41	4	3	------	196,378	28,678	225,056	82.4
Kansas	2	2	------	------	------	8,304	----------	8,304	73.3
Kentucky	1,161	1,927	143	179	136	37,247,887	13,197,910	50,445,797	90.9
Maryland	17	25	------	------	------	202,282	----------	202,282	62.1
Missouri	9	9	------	1	1	76,285	----------	76,285	75.6
Montana:									
Bituminous	12	20	1	------	------	204,286	8,266	212,552	96.1
Lignite	5	11	------	------	------	16,382	----------	16,382	100.0
Total Montana	17	31	1	------	------	220,668	8,266	228,934	96.4
New Mexico	9	10	1	3	1	81,920	13,603	95,523	69.6
North Dakota (lignite)	2	2	------	------	------	4,018	----------	4,018	100.0
Ohio	148	328	43	27	6	4,525,076	3,684,087	8,209,163	69.8
Oklahoma	5	53	------	------	------	429,145	----------	429.145	97.5
Pennsylvania	469	1,546	206	286	604	30,200,725	9,678,823	39,879,548	62.5
Tennessee	126	285	------	20	17	4,344,473	----------	4,344,473	86.1
Utah	46	52	97	1	107	947,294	5,600,303	6,547,597	95.5
Virginia	940	1,313	20	40	89	22,630,843	402,501	23,033,344	85.1
Washington	6	40	------	------	------	200,505	----------	200,505	58.4
West Virginia	885	3,230	182	535	516	103,196,741	17,327,702	120,524,443	85.3
Wyoming	9	237	------	21	------	604,857	----------	604,857	93.1
Total	4,152	10,015	923	1,306	1,675	221,042,460	73,143,785	294,186,245	81.6

TABLE 18.—Number of underground bituminous-coal and lignite mines and number of haulage units in use in the United States in selected years [1]

Year	Underground mines	Locomotives				Rope-haulage units			Shuttle cars			"Mother" conveyors	Animals
		Trolley	Battery	Other types	Total	Portable	Stationary	Total	Cable reel	Battery	Total		
1924	7,352	[2]12,765	1,515	443	14,723	(3)	(3)	649	(3)	(3)	(3)	(3)	36,352
1946	5,888	14,110	1,011	110	15,231	4,084	1,009	5,093	(3)	(3)	(3)	457	10,185
1948	7,108	14,617	904	74	15,595	3,886	1,044	4,930	(3)	(3)	(3)	755	10,834
1949	6,798	14,090	928	59	15,077	3,904	1,073	4,977	2,144	623	2,767	860	10,313
1950	7,559	13,822	949	62	14,833	4,225	1,037	5,262	2,782	512	3,294	1,013	10,033
1951	6,225	13,327	900	51	14,278	3,875	916	4,791	3,191	567	3,758	1.094	7,478
1952	5,632	12,545	812	41	13,398	3,584	852	4,436	3,382	462	3,844	1,066	6,555
1953	5,034	11,311	678	45	12,034	2,838	727	3,565	3,797	425	4,222	1,042	5,354
1954	4,653	10,155	762	38	10,955	1,926	781	2,707	4,400	431	4,831	1,081	5,409
1955	6,035	9,538	658	40	10,236	1,327	577	1,904	4,413	241	4,654	1,002	6,440
1956	6,542	9,445	861	102	10,408	1,420	575	1,995	5,047	260	5,307	1,114	6,097
1957	6,512	8,997	898	138	10,033	1,214	616	1,830	5,513	280	5,793	1,233	5,054

[1] Exclusive of lignite and Virginia semianthracite mines in 1946, 1948, and 1949.

[2] Includes combination trolley and battery locomotives.

[3] Data not available.

TABLE 19.—Number of haulage units in use in underground bituminous-coal and lignite mines in the United States, 1956–57, by States

State	Locomotives						Shuttle cars				Rope-haulage units				"Mother" conveyor units		Animals	
	Trolley		Battery		Other types		Cable reel		Battery		Portable		Stationary					
	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957
Alabama	352	354	6	1	1	------	174	179	3	3	58	67	20	20	37	48	168	93
Alaska	2	2	15	11	------	------	------	------	1	------	------	2	1	------	------	------	------	------
Arizona	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	4	4
Arkansas	3	3	9	10	------	1	------	------	------	------	------	2	8	9	5	7	7	7
Colorado	90	92	53	51	------	------	60	69	21	19	42	30	59	55	13	14	105	69
Georgia	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	1	6
Illinois	385	353	81	66	------	------	346	340	24	6	------	------	22	16	101	91	95	78
Indiana	131	126	3	3	------	1	104	101	1	------	1	------	11	12	6	------	44	39
Iowa	4	2	2	2	2	1	5	2	------	3	------	1	16	9	1	------	76	70
Kansas	------	------	------	------	------	------	------	------	------	------	------	------	1	1	------	------	6	6
Kentucky	1, 465	1, 417	32	45	6	12	1, 077	1, 212	27	63	103	75	49	58	171	160	1, 816	1, 661
Maryland	5	8	4	3	------	------	3	------	------	------	------	------	10	9	------	------	81	78
Missouri	2	------	3	2	------	------	------	------	------	------	------	------	1	1	------	------	27	27
Montana:																		
Bituminous	19	15	1	1	------	------	6	6	------	------	3	1	5	5	------	------	11	5
Lignite	------	------	------	------	------	------	------	------	2	2	------	------	------	1	------	------	4	4
Total Montana	19	15	1	1	------	------	6	6	2	2	3	1	5	6	------	------	15	9
New Mexico	3	3	6	6	------	------	3	3	------	------	4	------	5	9	------	------	36	27
North Dakota (lignite)	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	5	2
Ohio	323	251	22	22	2	2	148	121	2	4	14	22	20	23	35	31	150	110
Oklahoma	9	4	5	6	------	------	4	4	------	------	2	------	3	4	3	------	5	3
Pennsylvania	2, 483	2, 414	122	127	17	34	996	1, 132	77	61	813	675	185	217	203	253	863	731
Tennessee	157	146	8	9	5	1	47	44	------	------	5	2	5	8	13	18	467	323
Utah	157	167	14	21	------	1	151	184	7	11	7	2	28	29	29	35	15	12
Virginia	571	643	277	308	53	32	210	246	5	1	33	29	33	36	36	42	1, 111	849
Washington	23	23	------	------	------	------	------	------	------	------	14	11	19	9	------	2	4	2
West Virginia	3, 162	2, 875	194	200	16	53	1, 680	1, 841	90	107	257	232	50	62	453	524	993	846
Wyoming	99	99	4	4	------	------	33	29	------	------	64	63	24	23	8	8	3	2
Total	9, 445	8, 997	861	898	102	138	5, 047	5, 513	260	280	1, 420	1, 214	575	616	1, 114	1, 233	6, 097	5, 054

TABLE 20.—Number and production of underground bituminous-coal and lignite mines using "mother" conveyors and number and length of units in use in the United States, 1945–57[1]

Year	Number of mines	Production (net tons)	Number of units in use	Average length (feet)	Total length (miles)
1945	117	40, 189, 857	359	1, 438	97. 6
1946	161	46, 022, 710	457	1, 484	128. 5
1947	199	70, 690, 920	594	1, 470	165. 3
1948	270	81, 821, 361	755	1, 460	208. 8
1949	314	69, 947, 713	860	1, 514	246. 7
1950	374	92, 413, 644	1, 013	1, 538	294. 9
1951	372	99, 643, 003	1, 094	1, 568	325. 0
1952	358	92, 168, 992	1, 066	1, 526	308. 2
1953	322	100, 155, 249	1, 042	1, 541	303. 9
1954	291	83, 211, 284	1, 081	1, 626	332. 9
1955	314	97, 677, 313	1, 002	1, 682	319. 6
1956	314	126, 717, 518	1, 114	1, 656	349. 4
1957	362	136, 914, 192	1, 233	1, 672	390. 4

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[1] Includes all belt conveyors 500 feet or more long used for underground transportation of coal, except main-slope conveyors. Excludes lignite and Virginia semianthracite mines in 1945–49.

TABLE 21.—Number and production of underground bituminous-coal and lignite mines using "mother" conveyors, and number and length of units in use in the United States, 1956–57, by States[1]

State	Number of mines		Production (net tons)		Number of units in use		Average length (feet)		Total length (miles)	
	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957
Alabama	6	11	4, 264, 585	6, 007, 763	37	48	1, 706	1, 724	12. 0	15. 7
Arkansas	2	3	72, 759	90, 628	5	7	724	617	. 7	. 8
Colorado	3	4	807, 612	988, 053	13	14	1, 608	1, 821	4. 0	4. 8
Illinois	16	15	16, 526, 302	13, 870, 267	101	91	2, 334	2, 332	44. 6	40. 2
Indiana	2	------	615, 856	------------	6	--------	750	-------	. 9	------
Kentucky	44	44	19, 749, 555	18, 660, 137	171	160	1, 598	1, 871	51. 8	56. 7
Ohio	13	12	6, 517, 124	5, 622, 594	36	31	1, 617	1, 592	11. 0	9. 3
Oklahoma	1	------	53, 833	------------	3	--------	1, 250	-------	. 7	------
Pennsylvania	51	68	18, 445, 600	22, 755, 999	203	253	1, 676	1, 671	64. 4	80. 1
Tennessee	5	6	817, 716	1, 004, 810	13	18	1, 562	1, 348	3. 8	4. 6
Utah	13	16	1, 578, 770	3, 897, 663	29	35	1, 129	1, 108	6. 2	7. 3
Virginia	14	12	4, 964, 639	4, 465, 421	36	42	1, 731	1, 862	11. 8	14. 8
Washington	------	1	------------	38, 184	--------	2	-------	3, 500	------	1. 3
West Virginia	141	167	51, 916, 336	59, 398, 106	453	524	1, 579	1, 541	135. 5	152. 9
Wyoming	3	3	386, 831	114, 567	8	8	1, 350	1, 225	2. 0	1. 9
Total	314	362	126, 717, 518	136, 914, 192	1, 114	1, 233	1, 656	1, 672	349. 4	390. 4

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[1] Includes all mines using belt conveyors, other than main-slope conveyors, 500 feet or more long for underground transportation of coal.

STRIP MINING

Strip mines have two substantial advantages over underground mines. First, the output per man per day in strip mines is more than double that in underground mines; and, second, the average value of strip coal, f. o. b. mines, is about one-third lower than that of coal from underground mines.

The rapid growth of strip mining was made possible by development of larger and improved stripping and drilling equipment and trucks. The most notable recent change in stripping equipment has been replacement of virtually all steam shovels by diesel-powered and large electric shovels and draglines.

An increase in the average capacity of trucks used in strip mines has reduced the number required. The average hauling distance from strip mines to tipples or ramps has remained approximately 4 miles.

The average thickness of overburden at all bituminous-coal and lignite strip mines in the United States was 42 feet in 1955.[2] Several strip mines handled an average of more than 60 feet of overburden in 1955, and a few handled more than 70 feet.

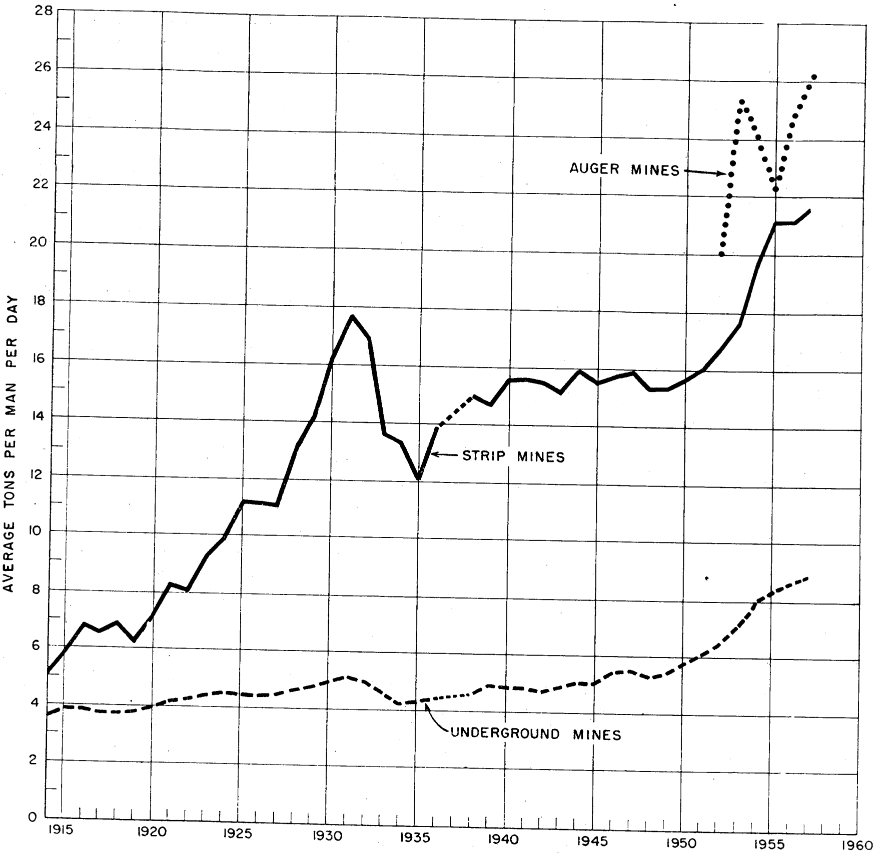

FIGURE 9.—Average tons per man per day at bituminous-coal and lignite mines in the United States, 1914–57, by underground, strip and auger mines.

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[2] Work cited in footnote 1.

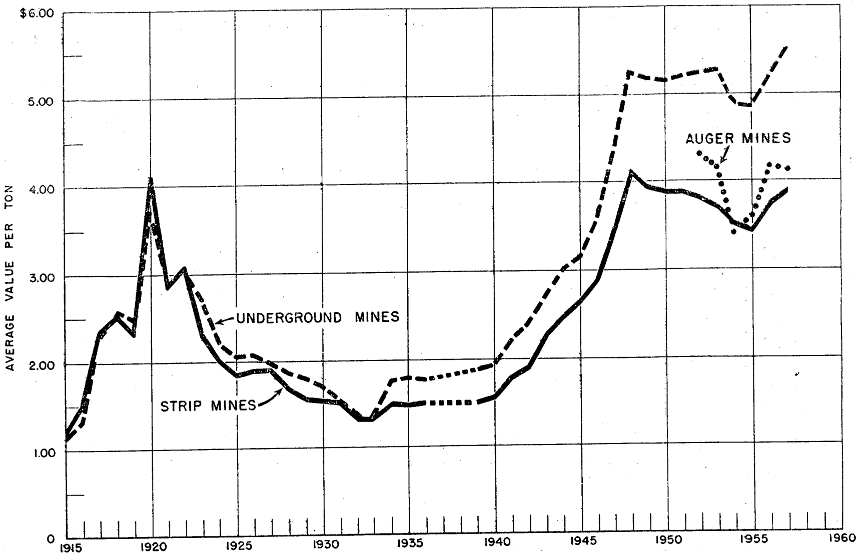

FIGURE 10.—Average value per ton, f. o. b. mines, of bituminous coal and lignite produced in the United States, 1915–57, by underground, strip, and auger mines.

TABLE 22.—Growth of strip mining at bituminous-coal and lignite mines in the United States, 1914–57, compared with underground and auger mining

Year	Production (thousand net tons)				Percentage of total mined by stripping	Average tons per man per day				Average value per ton f. o. b. mine				Number of strip mines	Number of power shovels and draglines
	Underground mines	Strip mines [1]	Auger mines	Total		Underground mines	Strip mines [1]	Auger mines	Total	Underground mines	Strip mines [1]	Auger mines	Total		
1914	421,423	1,281	----------	422,704	0.3	3.71	5.06	----------	3.71	(2)	(2)	----------	$1.17	[3] 35	48
1915	439,792	2,832	----------	442,624	.6	3.90	5.81	----------	3.91	$1.13	$1.18	----------	1.13	[3] 60	87
1916	498,587	3,933	----------	502,520	.8	3.88	6.67	----------	3.90	1.32	1.51	----------	1.32	[3] 79	111
1917	546,001	5,790	----------	551,791	1.0	3.75	6.52	----------	3.77	2.26	2.34	----------	2.26	[3] 126	182
1918	571,098	8,288	----------	579,386	1.4	3.76	6.81	----------	3.78	2.58	2.54	----------	2.58	[3] 165	276
1919	460,225	5,635	----------	465,860	1.2	3.82	6.21	----------	3.84	2.49	2.33	----------	2.49	[3] 168	287
1920	559,807	8,860	----------	568,667	1.5	3.97	7.20	----------	4.00	3.74	4.12	----------	3.75	[3] 174	312
1921	410,865	5,057	----------	415,922	1.2	4.18	8.28	----------	4.20	2.89	2.87	----------	2.89	[3] 155	279
1922	412,059	10,209	----------	422,268	2.4	4.24	8.09	----------	4.28	3.02	3.07	----------	3.02	272	379
1923	552,625	11,940	----------	564,565	2.1	4.43	9.32	----------	4.47	2.69	2.31	----------	2.68	263	442
1924	470,080	13,607	----------	483,687	2.8	4.50	9.91	----------	4.56	2.20	2.00	----------	2.20	234	420
1925	503,182	16,871	----------	520,053	3.2	4.45	11.18	----------	4.52	2.05	1.84	----------	2.04	227	389
1926	556,444	16,923	----------	573,367	3.0	4.42	11.13	----------	4.50	2.07	1.89	----------	2.06	237	410
1927	499,385	18,378	----------	517,763	3.6	4.47	11.06	----------	4.55	1.99	1.90	----------	1.99	255	455
1928	480,956	19,789	----------	500,745	4.0	4.61	13.02	----------	4.73	1.87	1.69	----------	1.86	250	415
1929	514,721	20,268	----------	534,989	3.8	4.73	14.08	----------	4.85	1.79	1.57	----------	1.78	200	411
1930	447,684	19,842	----------	467,526	4.3	4.93	16.21	----------	5.06	1.71	1.54	----------	1.70	218	341
1931	363,157	18,932	----------	382,089	5.0	5.12	17.68	----------	5.30	1.54	1.51	----------	1.54	235	314
1932	290,069	19,641	----------	309,710	6.3	4.99	16.95	----------	5.22	1.31	1.32	----------	1.31	255	332
1933	315,360	18,270	----------	333,630	5.5	4.60	13.59	----------	4.78	1.34	1.33	----------	1.34	289	389
1934	338,578	20,790	----------	359,368	5.8	4.23	13.28	----------	4.40	1.76	1.49	----------	1.75	344	458
1935	348,726	23,647	----------	372,373	6.4	4.32	12.01	----------	4.50	1.79	1.47	----------	1.77	368	507
1936	410,962	28,126	----------	439,088	6.4	4.42	13.91	----------	4.62	1.77	1.49	----------	1.76	381	562
1937	413,780	31,751	----------	445,531	7.1	(2)	(2)	----------	4.69	(2)	(2)	----------	1.94	449	(2)
1938	318,138	30,407	----------	348,545	8.7	4.60	15.00	----------	4.89	(2)	(2)	----------	1.95	465	737
1939	357,133	37,722	----------	394,855	9.6	4.92	14.68	----------	5.25	1.88	1.49	----------	1.84	537	914
1940	417,604	43,167	----------	460,771	9.4	4.86	15.63	----------	5.19	1.94	1.56	----------	1.91	638	1,071
1941	459,078	55,071	----------	514,149	10.7	4.83	15.59	----------	5.20	2.23	1.79	----------	2.19	769	1,321
1942	515,490	67,203	----------	582,693	11.5	4.74	15.52	----------	5.12	2.41	1.90	----------	2.36	834	1,438
1943	510,492	79,685	----------	590,177	13.5	4.89	15.15	----------	5.38	2.75	2.28	----------	2.69	1,004	1,839
1944	518,678	100,898	----------	619,576	16.3	5.04	15.89	----------	5.67	3.01	2.48	----------	2.92	1,240	2,312
1945	467,630	109,987	----------	577,617	19.0	5.04	15.46	----------	5.78	3.16	2.65	----------	3.06	1,370	2,439
1946	420,958	112,964	----------	533,922	21.1	5.43	15.73	----------	6.30	3.59	2.87	----------	3.44	1,445	2,744

1947	491,229	139,395	----------	630,624	22.1	5.49	15.93	----------	6.42	4.35	3.47	----------	4.16	1,750	3,254
1948	460,012	139,506	----------	599,518	23.3	5.31	15.28	----------	6.26	5.26	4.11	----------	4.99	1,971	3,712
1949	331,823	106,045	----------	437,868	24.2	5.42	15.33	----------	6.43	5.18	3.94	----------	4.88	1,761	3,576
1950	392,844	123,467	----------	516,311	23.9	5.75	15.66	----------	6.77	5.15	3.87	----------	4.84	1,870	3,877
1951	416,047	117,618	----------	533,665	22.0	6.08	16.02	----------	7.04	5.21	3.88	----------	4.92	1,784	3,810
1952	356,425	108,910	1,506	466,841	23.3	6.37	16.77	20.07	7.47	5.24	3.81	4.31	4.90	1,643	3,527
1953	349,551	105,448	2,291	457,290	23.1	7.01	17.62	25.30	8.17	5.27	3.75	4.15	4.92	1,554	3,390
1954	289,112	98,134	4,460	391,706	25.1	7.99	19.64	24.12	9.47	4.87	3.52	3.41	4.52	1,329	3,409
1955	343,465	115,093	6,075	464,633	24.8	8.28	21.12	22.22	9.84	4.86	3.48	3.60	4.50	1,617	3,265
1956	365,774	127,055	8,045	500,874	25.4	8.62	21.18	24.85	10.28	5.20	3.74	4.17	4.82	1,728	3,705
1957	360,649	124,109	7,946	492,704	25.2	8.91	21.64	26.19	10.59	5.52	3.89	4.12	5.08	1,756	3,723

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[1] Includes power strip pits proper and excludes horse stripping operations and mines combining stripping and underground in the same operation for the period 1914–42. The years 1943-57 include data on all strip mines.

[2] Data not available.

[3] Exclusive of horse stripping operations.

TABLE 23.—Number and production of bituminous-coal and lignite strip mines, and units of stripping and loading equipment in use in the United States, 1932–57

Year	Number of strip mines	Production (thousand net tons)	Number of power shovels and dragline excavators												Number of carry-all scrapers	Number of bulldozers
			By type of power					By capacity (in cubic yards) of dipper or bucket				By type of machine		Total		
			Electric	Diesel-electric	Diesel	Gasoline	Steam	Less than 3	3–5, inclusive	6–12, inclusive	More than 12	Power shovels	Dragline excavators			
1932	255	19,641	[1] 105	(2)	[3] 61	(4)	166	(5)	(5)	(5)	(5)	(5)	(5)	332	(5)	(5)
1933	289	18,270	[1] 117	(2)	[3] 103	(4)	169	(5)	(5)	(5)	(5)	(5)	(5)	389	(5)	(5)
1934	344	20,790	[1] 121	(2)	[3] 149	(4)	188	(5)	(5)	(5)	(5)	(5)	(5)	458	(5)	(5)
1935	368	23,647	[1] 139	(2)	[3] 194	(4)	174	(5)	(5)	(5)	(5)	(5)	(5)	507	(5)	(5)
1936	381	28,126	[1] 151	(2)	[3] 223	(4)	188	(5)	(5)	(5)	(5)	(5)	(5)	562	(5)	(5)
1937	449	31,751	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
1938	465	30,407	[1] 155	(2)	[3] 440	(4)	142	(5)	(5)	(5)	(5)	(5)	(5)	737	(5)	(5)
1939	537	37,722	[1] 184	(2)	[3] 524	(4)	206	(5)	(5)	(5)	(5)	(5)	(5)	914	(5)	(5)
1940	638	43,167	[1] 194	(2)	[3] 697	(4)	180	(5)	(5)	(5)	(5)	(5)	(5)	1,071	(5)	(5)
1941	769	55,071	[1] 210	(2)	[3] 911	(4)	200	1,009	153	95	64	(5)	(5)	1,321	(5)	(5)
1942	834	67,203	[1] 219	(2)	[3] 1,020	(4)	199	1,114	159	97	68	(5)	(5)	1,438	(5)	(5)
1943	1,004	79,685	[1] 234	(2)	[3] 1,433	(4)	172	1,488	173	106	72	(5)	(5)	1,839	(5)	(5)
1944	1,240	100,898	[1] 244	(2)	[3] 1,902	(4)	166	1,900	225	113	74	(5)	(5)	2,312	(5)	(5)
1945	1,370	109,987	[1] 256	(2)	[3] 2,042	(4)	141	2,004	243	117	75	(5)	(5)	2,439	(5)	(5)
1946	1,445	112,964	[1] 261	(2)	1,619	753	111	2,256	302	112	74	2,406	338	2,744	263	(5)
1947	1,750	139,395	[1] 301	(2)	2,279	591	83	2,685	362	123	84	2,822	432	3,254	275	(5)
1948	1,971	139,506	[1] 337	(2)	2,675	646	54	3,048	446	130	88	3,177	535	3,712	362	(5)
1949	1,761	106,045	[1] 352	(2)	2,646	527	51	2,931	367	168	110	3,011	565	3,576	320	(5)
1950	1,870	123,467	[1] 348	(2)	2,880	607	42	3,182	416	170	109	3,247	630	3,877	286	(5)
1951	1,784	117,618	[1] 346	(2)	2,905	533	26	3,088	420	187	115	3,164	646	3,810	220	(5)
1952	1,643	108,910	[1] 321	(2)	2,642	545	19	2,800	425	183	119	2,892	635	3,527	218	(5)
1953	1,554	105,448	[1] 317	(2)	2,629	446	17	2,692	413	193	111	2,793	616	3,409	244	1,954
1954	1,329	98,134	[1] 381	(2)	2,617	374	18	2,480	579	211	120	2,605	785	3,390	269	2,599
1955	1,617	115,093	[1] 315	(2)	2,603	337	10	2,381	550	223	111	2,592	673	3,265	187	2,106
1956	1,728	127,055	285	136	2,914	365	5	2,693	634	249	129	2,899	806	3,705	226	2,381
1957	1,756	124,109	325	164	2,839	389	6	2,748	566	266	143	2,894	829	3,723	215	2,499

[1] Includes diesel electric shovels.
[2] Included with electric shovels.
[3] Includes gasoline shovels.
[4] Included with diesel shovels.
[5] Data not available.

TABLE 24.—Number and production of bituminous-coal and lignite strip mines and units of stripping and loading equipment in use in the United States, 1957, by States

State	Number of strip mines	Production (net tons)	Number of power shovels and dragline excavators												Number of carryall scrapers	Number of bulldozers
			By type of power					By capacity (in cubic yards) of dipper or bucket				By type of machine		Total		
			Electric	Diesel-electric	Diesel	Gas	Steam	Less than 3	3-5, inclusive	6-12, inclusive	More than 12	Power shovels	Dragline excavators			
Alabama	36	2,172,307	7	9	70	1	----	60	14	9	4	70	17	87	9	50
Alaska	6	544,594	----	----	11	2	----	12	1	----	----	12	1	13	6	28
Arkansas	8	220,856	1	2	8	----	----	7	4	----	----	4	7	11	2	13
Colorado	5	363,132	2	----	6	----	----	3	3	2	----	4	4	8	3	10
Illinois	90	19,999,344	95	9	83	18	----	73	48	42	42	131	74	205	4	113
Indiana	50	10,891,242	48	6	58	20	----	58	32	22	20	80	52	132	7	86
Iowa	31	1,038,486	4	1	36	16	----	41	15	----	1	32	25	57	4	35
Kansas	14	737,677	5	5	13	2	1	16	3	4	3	13	13	26	1	20
Kentucky:																
Eastern	91	2,385,169	1	----	126	14	----	126	14	1	----	141	----	141	2	84
Western	74	15,227,623	38	5	106	12	----	82	30	28	21	121	40	161	6	94
Total Kentucky	165	17,612,792	39	5	232	26	----	208	44	29	21	262	40	302	8	178
Maryland	31	422,564	----	1	24	13	----	34	3	1	----	32	6	38	----	27
Missouri	29	2,874,837	22	3	15	9	2	20	12	8	11	34	17	51	2	32
Montana:																
Bituminous	2	166,111	4	----	----	1	----	1	----	1	3	3	2	5	----	3
Lignite	5	9,190	----	----	1	3	----	4	----	----	----	3	1	4	----	5
Total Montana	7	175,301	4	----	1	4	----	5	----	1	3	6	3	9	----	8
New Mexico	3	14,735	----	----	2	1	----	3	----	----	----	3	----	3	----	3
North Dakota (lignite)	36	2,556,634	20	4	14	14	----	32	10	9	1	42	10	52	23	40
Ohio	251	23,956,629	44	23	460	87	----	445	99	48	22	490	124	614	58	494
Oklahoma	20	1,755,249	8	9	21	----	1	15	12	8	4	23	16	39	----	16
Pennsylvania	663	21,220,728	21	74	1,204	127	----	1,177	170	72	7	1,036	390	1,426	56	916
South Dakota (lignite)	1	21,118	----	----	2	1	----	2	1	----	----	1	2	3	1	1
Tennessee	81	2,614,528	----	2	152	3	----	129	25	1	2	151	6	157	3	67
Virginia	37	1,867,982	----	----	64	2	----	60	6	----	----	66	----	66	6	51
Washington	1	16,875	----	----	1	----	----	1	----	----	----	1	----	1	----	2
West Virginia	184	11,563,421	1	11	353	41	1	339	58	8	2	389	18	407	10	292
Wyoming	7	1,467,507	4	----	9	2	1	8	6	2	----	12	4	16	12	17
Total	1,756	124,108,538	325	164	2,839	389	6	2,748	566	266	143	2,894	829	3,723	215	2,499

TABLE 25.—Summary of operations at bituminous-coal and lignite strip mines using power drills in bank or overburden in the United States, 1946–57

Year	Number of mines	Production at mines using power drills		Number of power drills
		Quantity (net tons)	Percentage of total strip production	
1946	514	75, 375, 841	66. 7	764
1947	598	95, 915, 346	68. 8	875
1948	728	98, 809, 393	72. 3	1, 195
1949	756	78, 146, 655	73. 7	1, 256
1950	692	87, 205, 280	70. 6	1, 201
1951	650	85, 331, 204	72. 5	1, 125
1952	629	79, 252, 284	73. 0	1, 070
1953	603	80, 259, 365	76. 1	1, 048
1954	541	70, 107, 205	71. 4	983
1955	564	85, 623, 050	74. 4	953
1956	696	96, 278, 779	75. 8	1, 041
1957	722	96, 418, 089	77. 7	1, 104

TABLE 26.—Summary of operations at bituminous-coal and lignite strip mines using power drills in bank or overburden in the United States, 1956–57, by States

State	Number of mines		Production at mines using power drills				Number of power drills					
			Quantity (net tons)		Percentage of total strip production		Horizontal		Vertical		Total	
	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957
Alabama	20	20	1,978,689	1,870,825	87.5	86.1	19	12	18	19	37	31
Alaska	4	6	449,238	544,594	97.1	100.0	3	4	8	9	11	13
Arkansas	4	5	207,931	171,543	81.7	77.7	8	5	---	1	8	6
Colorado	3	3	338,122	323,497	94.4	89.1	2	3	5	3	7	6
Illinois	44	52	16,511,784	17,651,894	83.9	88.3	39	40	30	40	69	80
Indiana	38	35	11,158,830	10,536,073	93.7	96.7	39	34	22	27	61	61
Iowa	22	21	972,015	926,973	89.6	89.3	24	23	12	12	36	35
Kansas	7	7	823,902	713,631	94.6	96.7	11	12	---	1	11	13
Kentucky:												
Eastern	24	34	1,059,571	1,274,710	51.3	53.4	21	30	5	7	26	37
Western	32	39	13,444,080	13,698,699	93.4	90.0	31	35	28	33	59	68
Total Kentucky	56	73	14,503,651	14,973,409	88.1	85.0	52	65	33	40	85	105
Maryland	2	1	10,423	2,610	3.2	.6	1	---	---	1	1	1
Missouri	12	13	2,738,011	2,741,421	87.1	95.4	16	17	2	3	18	20
Montana:												
Bituminous	1	1	440,166	164,311	99.7	98.9	1	---	3	2	4	2
Lignite	1	---	1,232	---	14.7	---	---	---	1	---	1	---
Total Montana	2	1	441,398	164,311	98.1	98.9	1	---	4	2	5	2
New Mexico	1	1	10,513	13,086	90.0	88.8	---	---	2	2	2	2
North Dakota (lignite)	3	3	382,570	660,290	13.6	25.8	2	1	2	2	4	3
Ohio	112	106	19,615,789	18,488,350	81.2	77.2	97	87	61	85	158	172
Oklahoma	15	11	1,320,128	1,466,137	87.1	83.5	13	10	9	8	22	18
Pennsylvania	193	197	12,297,787	11,845,765	52.1	55.8	179	155	95	117	274	272
South Dakota (lignite)	1	1	24,519	21,118	100.0	100.0	1	1	---	---	1	1
Tennessee	19	30	610,825	818,444	31.1	31.3	17	29	9	5	26	34
Virginia	16	18	1,330,014	1,594,156	67.6	85.3	16	18	8	9	24	27
West Virginia	116	112	9,050,181	9,444,295	74.4	81.7	106	118	66	75	172	193
Wyoming	6	6	1,502,459	1,445,667	98.4	98.5	6	6	3	3	9	9
Total	696	722	96,278,779	96,418,089	75.8	77.7	652	640	389	464	1,041	1,104

TABLE 27.—Summary of method of haulage from bituminous-coal and lignite strip mines to tipple or ramp, in the United States, 1948–57 [1]

Year	Strip mines reporting method of haulage							Strip mines not reporting method of haulage—production (net tons)	Total strip production (net tons)
	Strip mines using trucks				Strip mines using rail, rail and truck, truck and tram—production (net tons)	Production of strip mines reporting			
	Production (net tons)	Number of trucks	Average capacity per truck (net tons)	Average distance hauled (miles)		Quantity (net tons)	Percentage of total strip production		
1948	97,450,399	7,214	9.4	3.7	6,327,989	103,778,388	74.4	35,727.532	139,505,920
1949	73,229,556	6,694	10.1	3.7	5,365,432	78,594,988	74.1	27,450,311	106,045,299
1950	88,666,733	6,564	10.3	3.8	4,364,333	93,031,066	75.3	30,435.498	123,466,564
1951	87,427,029	6,173	10.6	4.0	2,424,994	89,852,023	76.4	27,765,653	117,617,676
1952	88,589,637	5,799	11.3	4.0	2,296,744	90,886,381	83.5	18,023,375	108,909,756
1953	84,764,694	5,287	12.2	4.0	2,104,609	86,869,303	82.4	18,579,266	105,448,569
1954	73,794,489	4,250	13.2	3.9	1,203,753	74,998,242	76.4	23,136,008	98,134,250
1955	94,150,171	4,798	13.3	3.9	2,290,600	96,440,771	83.9	18,651,998	115,092,769
1956	103,127,374	5,432	13.3	4.4	1,056,627	104,184,001	82.0	22,871,381	127,055,382
1957	104,796,728	5,532	14.0	4.3	164,311	104,961,039	84.6	19,147,499	124,108,538

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[1] Excludes lignite in 1948 and 1949.

TABLE 28.—Summary of method of haulage from bituminous-coal and lignite strip mines to tipple or ramp, in the United States, 1957, by States

State	Strip mines reporting method of haulage							Strip mines not reporting method of haulage—production (net tons)	Total strip production (net tons)
	Strip mines using trucks				Strip mines using rail, rail and truck, truck and tram—production (net tons)	Production of strip mines reporting			
	Production (net tons)	Number of trucks	Average capacity per truck (net tons)	Average distance hauled (miles)		Quantity (net tons)	Percentage of total strip production		
Alabama	1, 878, 440	108	14. 8	4. 0	----------	1, 878, 440	86. 5	293, 867	2, 172, 307
Alaska	544, 594	32	15. 0	3. 5	----------	544, 594	100. 0	----------	544, 594
Arkansas	201, 603	29	8. 6	5. 5	----------	201, 603	91. 3	19, 253	220, 856
Colorado	340, 683	19	16. 7	3. 1	----------	340, 683	93. 8	22, 449	363, 132
Illinois	19, 657, 998	475	22. 9	2. 4	----------	19, 657, 998	98. 3	341, 346	19, 999, 344
Indiana	10, 475, 476	226	24. 3	3. 7	----------	10, 475, 476	96. 2	415, 766	10, 891, 242
Iowa	909, 699	51	10. 0	3. 9	----------	909, 699	87. 6	128, 787	1, 038, 486
Kansas	729, 120	30	19. 1	1. 7	----------	729, 120	98. 8	8, 557	737, 677
Kentucky	13, 932, 612	477	13. 8	3. 0	----------	13, 932, 612	79. 1	3, 680, 180	17, 612, 792
Maryland	191, 889	23	11. 1	6. 0	----------	191, 889	45. 4	230, 675	422, 564
Missouri	2, 769, 167	87	30. 6	3. 2	----------	2, 769, 167	96. 3	105, 670	2, 874, 837
Montana:									
Bituminous	1, 800	4	6. 0	1. 7	164, 311	166, 111	100. 0	----------	166, 111
Lignite	6, 371	5	4. 4	. 3	----------	6, 371	69. 3	2, 819	9, 190
Total Montana	8, 171	9	5. 1	. 6	164, 311	172, 482	98. 4	2, 819	175, 301
New Mexico	14, 735	5	4. 0	. 8	----------	14, 735	100. 0	----------	14, 735
North Dakota (lignite)	2, 491, 486	86	13. 6	2. 1	----------	2, 491, 486	97. 4	65, 148	2, 556, 634
Ohio	20, 651, 454	888	14. 0	5. 7	----------	20, 651, 454	86. 2	3, 305, 175	23, 956, 629
Oklahoma	1, 537, 186	104	10. 1	4. 3	----------	1, 537, 186	87. 6	218, 063	1, 755, 249
Pennsylvania	15, 672, 904	1, 838	11. 1	5. 5	----------	15, 672, 904	75. 8	5, 547, 824	21, 220, 728
South Dakota (lignite)	21, 118	3	6. 0	1. 0	----------	21, 118	100. 0	----------	21, 118
Tennessee	743, 634	141	10. 6	4. 7	----------	743, 634	28. 4	1, 870, 894	2, 614, 528
Virginia	1, 575, 238	115	10. 5	5. 6	----------	1, 575, 238	84. 3	292, 744	1, 867, 982
Washington	16, 875	3	10. 0	1. 0	----------	16, 875	100. 0	----------	16, 875
West Virginia	8, 986, 988	751	12. 9	5. 6	----------	8, 986, 988	77. 7	2, 576, 433	11, 563, 421
Wyoming	1, 445, 658	32	15. 5	2. 4	----------	1, 445, 658	98. 5	21, 849	1, 467, 507
Total	104, 796, 728	5, 532	14. 0	4. 3	164, 311	104, 961, 039	84. 6	19, 147, 499	124, 108, 538

TABLE 29.—Stripping operations in the bituminous-coal and lignite fields of the United States, 1957, by States and counties

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Alabama:						
Blount	3	227,372	85	178	15,058	15.10
Cullman	3	20,086	20	82	1,628	12.34
Jefferson	5	496,159	105	234	24,660	20.12
Marion	2	11,526	10	138	1,380	8.35
St. Clair	1	2,000	3	48	144	13.89
Tuscaloosa	9	485,582	171	179	30,521	15.91
Walker	12	928,182	255	205	52,233	17.77
Winston	1	1,400	2	72	144	9.72
Total Alabama	36	2,172,307	651	193	125,768	17.27
Alaska	6	544,594	129	235	30,323	17.96
Arkansas:						
Franklin	(1)	(1)	(1)	(1)	(1)	(1)
Johnson	4	153,680	68	218	14,763	10.41
Pope	1	1,390	1	203	124	11.18
Sebastian	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	3	65,786	184	74	13,542	4.86
Total Arkansas	8	220,856	253	112	28,429	7.77
Colorado:						
El Paso	1	7,553	3	220	660	11.44
Fremont	1	22,449	3	242	726	30.92
Routt	3	333,130	78	184	14,365	23.19
Total Colorado	5	363,132	84	188	15,751	23.05
Illinois:						
Bureau	(1)	(1)	(1)	(1)	(1)	(1)
Fulton	11	5,428,072	788	258	203,222	26.71
Gallatin	7	88,621	43	45	1,948	45.49
Greene	1	5,248	2	300	600	8.75
Grundy	(1)	(1)	(1)	(1)	(1)	(1)
Hancock	1	34,522	14	160	2,234	15.45
Jackson	(1)	(1)	(1)	(1)	(1)	(1)
Jefferson	1	6,281	14	60	840	7.48
Kankakee	(1)	(1)	(1)	(1)	(1)	(1)
Knox	(1)	(1)	(1)	(1)	(1)	(1)
La Salle	(1)	(1)	(1)	(1)	(1)	(1)
Livingston	2	2,222	5	73	365	6.09
Peoria	7	315,311	75	203	15,292	20.62
Perry	5	3,073,685	508	250	126,907	24.22
Randolph	1	42,082	13	130	1,690	24.90
St. Clair	(1)	(1)	(1)	(1)	(1)	(1)
Saline	13	1,322,413	336	209	70,266	18.82
Schuyler	1	5,234	4	161	691	7.58
Vermilion	5	1,012,545	142	251	35,578	28.46
Will	(1)	(1)	(1)	(1)	(1)	(1)
Williamson	16	2,467,223	343	212	72,651	33.96
Other counties	19	6,195,885	1,240	212	263,001	23.56
Total Illinois	90	19,999,344	3,527	225	795,285	25.15
Indiana:						
Clay	10	710,857	185	246	45,451	15.64
Daviess	1	17,400	14	206	2,881	6.04
Fountain	1	41,802	27	163	4,414	9.47
Gibson	1	205,045	54	237	12,791	16.03
Greene	9	1,618,966	208	197	40,955	39.53
Knox	1	348,316	69	232	16,044	21.71
Martin	1	63,263	24	240	5,762	10.98
Owen	(1)	(1)	(1)	(1)	(1)	(1)
Parke	(1)	(1)	(1)	(1)	(1)	(1)
Pike	7	2,260,373	407	268	108,986	20.74
Spencer	(1)	(1)	(1)	(1)	(1)	(1)
Sullivan	1	1,416	4	36	144	9.83
Vermillion	2	73,441	29	210	6,120	12.00
Vigo	2	511,260	77	216	16,637	30.73
Warrick	9	4,861,177	415	262	108,751	44.70
Other counties	5	177,926	82	170	13,962	12.74
Total Indiana	50	10,891,242	1,595	240	382,898	28.44

For footnote, see end of table.

TABLE 29.—Stripping operations in the bituminous-coal and lignite fields of the United States, 1957, by States and counties—Continued

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Iowa:						
Davis	1	31,115	10	275	2,751	11.31
Lucas	1	2,268	2	100	227	10.00
Mahaska	8	167,211	42	264	11,125	15.03
Marion	11	674,151	118	237	28,066	24.02
Monroe	4	55,141	18	239	4,203	13.12
Polk	1	13,163	2	260	520	25.31
Van Buren	2	21,677	18	183	3,299	6.57
Wapello	3	73,760	22	232	5,180	14.24
Total Iowa	31	1,038,486	232	239	55,371	18.76
Kansas:						
Bourbon	1	4,600	8	97	810	5.68
Cherokee	5	529,674	120	280	33,694	15.72
Coffey	1	2,025	5	115	599	3.38
Crawford	6	199,953	118	121	14,313	13.97
Osage	1	1,425	2	156	355	4.01
Total Kansas	14	737,677	253	197	49,771	14.82
Kentucky, Eastern:						
Bell	14	403,019	87	201	17,439	23.11
Boyd	1	168,675	65	285	18,515	9.11
Breathitt	(1)	(1)	(1)	(1)	(1)	(1)
Clay	11	428,591	79	205	16,143	26.55
Elliott	1	10,800	4	198	747	14.46
Harlan	3	101,900	82	111	9,098	11.20
Jackson	2	15,967	33	90	2,941	5.43
Knott	1	22,888	8	198	1,583	14.46
Knox	11	129,934	44	143	6,326	20.54
Laurel	4	158,761	48	256	12,184	13.03
Lee	1	1,726	1	198	119	14.46
Leslie	1	4,000	1	198	277	14.46
Letcher	5	91,562	32	198	6,332	14.46
McCreary	1	91,001	32	198	6,293	14.46
Morgan	6	92,473	57	119	6,804	13.59
Perry	2	115,628	40	198	7,996	14.46
Pike	(1)	(1)	(1)	(1)	(1)	(1)
Pulaski	4	93,300	17	257	4,298	21.71
Rockcastle	3	59,250	21	198	4,098	14.46
Wayne	1	11,500	4	198	795	14.46
Whitley	15	212,655	79	172	13,571	15.67
Other counties	4	171,539	76	131	9,927	17.28
Total Eastern Kentucky	91	2,385,169	810	180	145,486	16.39
Kentucky, Western:						
Butler	1	1,500	7	30	198	7.57
Christian	1	1,200	2	229	35	34.19
Daviess	(1)	(1)	(1)	(1)	(1)	(1)
Grayson	1	1,125	1	229	33	34.19
Hancock	2	33,533	19	68	1,261	26.59
Hopkins	28	5,175,208	617	219	135,194	38.28
Muhlenberg	11	4,296,120	686	188	129,051	33.29
Ohio	10	3,011,462	321	224	71,890	41.89
Union	1	6,300	1	229	184	34.19
Webster	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	19	2,701,175	345	231	79,623	33.92
Total Western Kentucky	74	15,227,623	1,999	209	417,469	36.48
Total Kentucky	165	17,612,792	2,809	200	562,955	31.29
Maryland:						
Allegany	15	127,968	69	183	12,583	10.17
Garrett	16	294,596	64	161	10,380	28.38
Total Maryland	31	422,564	133	173	22,963	18.40

For footnote, see end of table.

TABLE 29.—Stripping operations in the bituminous-coal and lignite fields of the United States, 1957, by States and counties—Continued

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Missouri:						
Barton	(1)	(1)	(1)	(1)	(1)	(1)
Bates	(1)	(1)	(1)	(1)	(1)	(1)
Boone	2	4,327	6	84	503	8.60
Callaway	(1)	(1)	(1)	(1)	(1)	(1)
Clark	1	6,627	8	90	718	9.23
Dade	1	14,540	9	285	2,564	5.67
Henry	(1)	(1)	(1)	(1)	(1)	(1)
Macon	(1)	(1)	(1)	(1)	(1)	(1)
Putnam	2	72,900	31	207	6,323	11.53
Ralls	2	3,630	11	128	1,412	2.57
St. Clair	3	250,365	62	247	15,211	16.46
Vernon	4	85,936	29	217	6,296	13.65
Other counties	14	2,436,512	550	239	131,687	18.50
Total Missouri	29	2,874,837	706	233	164,714	17.45
Montana (bituminous): Rosebud	2	166,111	43	171	7,357	22.58
Montana (lignite):						
Dawson	(1)	(1)	(1)	(1)	(1)	(1)
Sheridan	(1)	(1)	(1)	(1)	(1)	(1)
Total Montana (lignite)	5	9,190	11	113	1,240	7.41
Total Montana	7	175,301	54	159	8,597	20.39
New Mexico: McKinley	3	14,735	10	204	2,038	7.23
North Dakota (lignite):						
Adams	1	26,325	8	200	1,600	16.45
Bowman	(1)	(1)	(1)	(1)	(1)	(1)
Burke	(1)	(1)	(1)	(1)	(1)	(1)
Burleigh	1	13,627	3	96	288	47.32
Divide	(1)	(1)	(1)	(1)	(1)	(1)
Dunn	3	11,029	7	146	1,039	10.62
Grant	3	20,156	9	146	877	22.98
Hettinger	(1)	(1)	(1)	(1)	(1)	(1)
McLean	4	114,939	22	188	4,152	27.68
Mercer	5	912,668	103	190	19,594	46.58
Morton	4	28,396	12	187	2,188	12.98
Oliver	2	9,521	4	73	289	33.00
Stark	3	67,734	13	139	1,802	37.59
Ward	(1)	(1)	(1)	(1)	(1)	(1)
Other counties	10	1,352,239	177	219	38,698	34.94
Total North Dakota (lignite)	36	2,556,634	358	197	70,527	36.25
Ohio:						
Athens	(1)	(1)	(1)	(1)	(1)	(1)
Belmont	24	1,328,115	260	243	63,153	21.03
Carroll	9	365,041	90	252	22,659	16.11
Columbiana	30	1,420,246	299	282	84,188	16.87
Coshocton	10	981,334	212	271	57,321	17.12
Gallia	6	626,337	137	300	41,206	15.20
Guernsey	11	703,287	130	241	31,271	22.49
Harrison	11	6,320,534	850	247	209,915	30.11
Hocking	7	52,650	26	194	5,127	10.27
Holmes	(1)	(1)	(1)	(1)	(1)	(1)
Jackson	14	406,017	116	192	22,345	18.17
Jefferson	18	2,176,798	364	263	95,641	22.76
Lawrence	4	229,521	81	145	11,776	19.49
Mahoning	12	708,898	140	293	40,929	17.32
Meigs	5	415,520	100	168	16,809	24.72
Morgan	5	1,742,266	207	252	52,117	33.43
Muskingum	(1)	(1)	(1)	(1)	(1)	(1)
Noble	4	1,186,215	95	261	24,780	47.87
Perry	15	1,903,822	382	258	98,644	19.30
Portage	1	122,410	23	311	7,146	17.13
Stark	15	757,515	284	223	63,337	11.96
Tuscarawas	29	1,625,373	398	277	110,344	14.73
Vinton	7	107,070	75	241	18,056	5.93
Washington	4	250,456	35	240	8,318	30.11
Wayne	1	109,259	26	307	7,981	13.69
Other counties	9	417,945	71	239	16,946	24.66
Total Ohio	251	23,956,629	4,401	252	1,110,009	21.58

For footnote, see end of table.

TABLE 29.—Stripping operations in the bituminous-coal and lignite fields of the United States, 1957, by States and counties—Continued

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Oklahoma:						
Craig	4	109, 192	42	225	9, 545	11. 44
Haskell	5	362, 257	83	252	20, 928	17. 31
Latimer	1	74, 203	12	202	2, 424	30. 61
Le Flore	(1)	(1)	(1)	(1)	(1)	(1)
McIntosh	(1)	(1)	(1)	(1)	(1)	(1)
Okmulgee	2	12, 164	42	48	2, 007	6. 06
Pittsburg	1	3, 300	41	30	1, 236	2. 67
Rogers	(1)	(1)	(1)	(1)	(1)	(1)
Sequoyah	2	353, 670	43	357	15, 431	22. 92
Other counties	5	840, 463	220	241	53, 128	15. 82
Total Oklahoma	20	1, 755, 249	483	217	104, 699	16. 76
Pennsylvania:						
Allegheny	27	481, 025	193	210	40, 627	11. 84
Armstrong	38	1, 098, 058	281	211	59, 290	18. 52
Beaver	11	220, 026	86	243	20, 856	10. 55
Bedford	2	12, 913	13	90	1, 151	11. 22
Blair	(1)	(1)	(1)	(1)	(1)	(1)
Bradford	(1)	(1)	(1)	(1)	(1)	(1)
Butler	45	1, 679, 211	369	258	95, 086	17. 66
Cambria	26	572, 044	295	183	53, 916	10. 61
Cameron	(1)	(1)	(1)	(1)	(1)	(1)
Centre	22	985, 496	315	237	74, 546	13. 22
Clarion	36	2, 711, 404	632	263	166, 242	16. 31
Clearfield	120	5, 079, 205	1, 480	232	343, 422	14. 79
Clinton	7	552, 916	134	216	29, 024	19. 05
Elk	11	157, 220	92	163	14, 988	10. 49
Fayette	51	592, 347	142	164	23, 238	25. 49
Greene	2	5, 977	7	72	495	12. 07
Huntingdon	5	28, 060	20	132	2, 581	10. 87
Indiana	40	1, 036, 511	355	205	72, 738	14. 25
Jefferson	32	969, 151	332	216	71, 630	13. 53
Lawrence	24	1, 012, 682	179	274	49, 017	20. 66
Lycoming	2	69, 808	21	286	5, 997	11. 64
McKean	(1)	(1)	(1)	(1)	(1)	(1)
Mercer	9	457, 805	83	298	24, 626	18. 59
Somerset	72	1, 346, 118	377	192	72, 411	18. 59
Tioga	(1)	(1)	(1)	(1)	(1)	(1)
Venango	10	810, 598	124	283	35, 030	23. 14
Washington	24	816, 610	240	196	47, 040	17. 36
Westmoreland	35	164, 810	105	123	12, 916	12. 76
Other counties	12	360, 733	115	197	22, 685	15. 90
Total Pennsylvania	663	21, 220, 728	5, 990	224	1, 339, 552	15. 84
South Dakota (lignite): Dewey	1	21, 118	10	240	2, 397	8. 81
Tennessee:						
Anderson	8	322, 319	76	171	12, 950	24. 89
Campbell	19	464, 694	271	122	33, 098	14. 04
Claiborne	9	227, 208	132	201	26, 543	8. 56
Cumberland	5	75, 127	20	191	3, 747	20. 05
Fentress	(1)	(1)	(1)	(1)	(1)	(1)
Grundy	4	167, 109	38	169	6, 347	26. 33
Hamilton	(1)	(1)	(1)	(1)	(1)	(1)
Marion	1	27, 750	9	172	1, 607	17. 27
Morgan	14	494, 443	144	156	22, 414	22. 06
Scott	14	552, 798	186	139	25, 892	21. 35
Van Buren	1	15, 507	8	141	1, 130	13. 72
White	1	95, 635	230	221	5, 084	18. 81
Other counties	5	171, 938	43	186	7, 981	21. 54
Total Tennessee	81	2, 614, 528	1, 157	127	146, 793	17. 81

For footnote, see end of table.

TABLE 29.—Stripping operations in the bituminous-coal and lignite fields of the United States, 1957, by States and counties—Continued

State and county	Number of strip mines	Production (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
Virginia:						
Buchanan	4	64,182	34	135	4,584	14.00
Dickenson	12	483,158	118	227	26,738	18.07
Lee	1	1,481	1	219	87	17.02
Russell	(1)	(1)	(1)	(1)	(1)	(1)
Tazewell	(1)	(1)	(1)	(1)	(1)	(1)
Wise	15	1,062,440	207	221	45,755	23.22
Other counties	5	256,721	55	235	12,937	19.84
Total Virginia	37	1,867,982	415	217	90,101	20.73
Washington: Kittitas	1	16,875	6	105	627	26.91
West Virginia:						
Barbour	12	942,644	186	209	38,808	24.29
Boone	(1)	(1)	(1)	(1)	(1)	(1)
Brooke	5	249,419	46	266	12,335	20.22
Clay	2	16,116	3	209	727	22.18
Fayette	12	342,400	130	187	24,318	14.08
Gilmer	2	172,579	20	168	3,373	51.16
Grant	2	42,154	9	209	1,901	22.18
Greenbrier	6	265,040	112	222	24,957	10.62
Hancock	1	2,428	11	215	2,357	1.03
Harrison	28	1,590,618	425	198	84,204	18.89
Kanawha	7	208,521	51	233	11,929	17.48
Lewis	5	804,094	196	236	46,345	17.35
Logan	1	267,680	33	247	8,201	32.64
Marion	(1)	(1)	(1)	(1)	(1)	(1)
McDowell	20	1,156,169	256	215	55,003	21.02
Mercer	6	252,220	89	201	17,939	14.06
Mineral	(1)	(1)	(1)	(1)	(1)	(1)
Mingo	4	355,859	145	180	26,185	13.59
Monongalia	3	52,676	11	209	2,375	22.18
Nicholas	6	382,308	118	244	28,723	13.31
Pocahontas	1	30,151	7	209	1,359	22.18
Preston	11	828,124	120	217	26,091	31.72
Putnam	(1)	(1)	(1)	(1)	(1)	(1)
Raleigh	13	1,034,488	201	197	39,560	26.15
Randolph	5	132,311	31	186	5,844	22.64
Taylor	4	336,452	44	252	11,152	30.17
Tucker	5	353,240	91	216	19,624	18.00
Upshur	7	226,046	37	216	7,893	28.64
Webster	2	34,363	7	209	1,549	22.18
Wyoming	7	943,516	141	248	35,075	26.90
Other counties	7	541,805	182	196	35,718	15.17
Total West Virginia	184	11,563,421	2,702	212	573,545	20.16
Wyoming:						
Campbell	1	365,859	26	303	7,861	46.54
Carbon	2	118,280	38	232	8,814	13.42
Converse	1	6,250	2	300	600	10.42
Lincoln	1	577,139	57	249	14,166	40.74
Sheridan	2	399,979	87	232	20,150	19.85
Total Wyoming	7	1,467,507	210	246	51,591	28.45
Total United States	1,756	124,108,538	26,168	219	5,734,704	21.64

[1] Included in "Other counties" to avoid disclosing individual operations.

AUGER MINING

Augers are generally used in areas where strip mining has become economically impracticable because of thick overburden. They were used first about 1945, and separate statistics on coal-recovery augers begin with 1952. The rapidly expanded production of coal by stripping during World War II in the mountainous areas of the northern Appalachian region left many miles of highwall containing exposed coal seams. After several years of experimentation, large, efficient augers as much as 60 inches in diameter were developed to recover the coal from these exposed coal seams.

Production at auger mines increased rapidly from less than 2 million tons in 1952 to 8 million tons in 1957. Augers were used to mine coal in 7 States in 1957, and sales of augers reported by 4 manufacturers indicate continued rapid growth of auger mining. A few coal-recovery augers have been sold for underground use; these units and the coal produced by them have been included with coal loaded mechanically underground.

TABLE 30.—Auger mines in the bituminous-coal and lignite fields of the United States, 1957, by States and counties

State and county	Number of auger mines	Equipment in use (number of units)				Mined by augers (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
		Augers	Power shovels	Power drills	Bulldozers					
Alabama: Walker	1	1	-------	-------	-------	8,899	4	93	373	23.86
Kentucky, Eastern:										
Bell	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Boyd	1	2	-------	-------	-------	31,530	8	167	1,267	24.88
Breathitt	1	1	-------	-------	-------	22,000	5	167	884	24.88
Floyd	1	1	-------	-------	-------	2,100	1	84	84	24.88
Harlan	9	9	2	-------	5	231,618	163	52	8,500	27.25
Knott	2	2	-------	-------	-------	19,486	5	167	783	24.88
Leslie	3	3	2	2	2	91,533	56	77	4,322	21.18
Letcher	1	1	-------	-------	-------	3,863	3	128	384	10.06
Magoffin	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Perry	10	10	1	-------	2	198,756	31	180	5,507	36.09
Pike	27	30	2	14	22	873,715	214	161	34,480	25.34
Other counties	3	3	1	-------	1	32,304	13	59	762	42.39
Total Eastern Kentucky	58	62	8	16	32	1,506,905	499	114	56,973	26.45
Kentucky, Western:										
Hopkins	1	1	-------	-------	1	23,656	3	130	390	60.66
Webster	1	1	-------	-------	-------	9,317	1	190	160	58.21
Total Western Kentucky	2	2	-------	-------	1	32,973	4	138	550	59.95
Total Kentucky	60	64	8	16	33	1,539,878	503	114	57,523	26.77
Ohio:										
Athens	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Belmont	5	4	-------	1	2	153,834	35	126	4,454	34.54
Columbiana	6	6	-------	-------	2	67,064	19	260	4,835	13.87
Gallia	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Guernsey	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Harrison	5	4	-------	-------	3	167,003	27	206	5,537	30.16
Hocking	3	3	-------	-------	3	17,481	6	298	1,917	9.12
Jefferson	9	10	2	-------	5	282,964	149	147	21,867	12.94
Meigs	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Muskingum	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Perry	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Tuscarawas	3	3	-------	-------	1	24,208	8	240	1,849	13.09
Other counties	11	12	-------	2	10	428,374	63	127	8,008	53.49
Total Ohio	42	42	2	3	26	1,140,928	307	158	48,467	23.54

For footnote, see end of table

TABLE 30.—Auger mines in the bituminous-coal and lignite fields of the United States, 1957, by States and counties—Continued

State and county	Number of auger mines	Equipment in use (number of units)				Mined by augers (net tons)	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day
		Augers	Power shovels	Power drills	Bulldozers					
Pennsylvania:										
Allegheny	1	1	------	------	------	1,401	1	197	197	18.30
Armstrong	9	9	------	------	1	96,921	22	219	4,803	20.18
Beaver	1	1	------	------	------	3,133	1	148	148	21.18
Butler	2	2	------	------	------	32,089	3	253	659	48.69
Cambria	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Centre	1	1	------	------	------	10,800	6	118	661	16.33
Clearfield	10	11	------	------	------	75,027	22	120	2,593	28.93
Clinton	1	2	------	------	------	8,894	6	148	859	10.35
Elk	1	1	------	------	1	17,588	5	122	585	30.05
Fayette	1	1	------	------	------	4,960	3	118	304	16.33
Indiana	4	4	------	------	1	33,224	17	118	2,035	16.33
Jefferson	2	2	------	------	------	16,281	7	143	1,013	16.07
Lawrence	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Somerset	4	5	------	------	------	23,622	18	104	1,873	12.61
Washington	1	1	------	------	------	17,095	7	174	1,266	13.50
Westmoreland	2	2	------	------	------	4,427	6	87	520	8.51
Other counties	3	3	------	------	------	21,137	7	127	886	23.86
Total Pennsylvania	43	46	------	------	3	366,599	131	140	18,402	19.92
Tennessee:										
Anderson	1	3	------	------	------	32,333	4	160	640	50.52
Claiborne	3	3	------	------	1	76,011	9	171	1,524	49.86
Cumberland	1	1	------	------	------	1,500	3	60	180	8.33
Fentress	1	1	------	------	------	34,183	5	182	910	37.56
Morgan	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Scott	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
White	1	1	------	------	------	94,871	12	221	2,652	35.77
Other counties	2	2	------	------	------	56,161	12	129	1,546	36.32
Total Tennessee	9	11	------	------	1	295,059	45	166	7,452	39.59
Virginia:										
Buchanan	10	11	1	------	9	140,329	65	258	16,826	8.34
Dickenson	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Russell	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Tazewell	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Wise	5	8	------	1	3	233,223	37	180	6,578	35.45
Other counties	8	8	------	2	5	202,929	46	151	6,924	29.31
Total Virginia	23	27	1	3	17	576,481	148	205	30,328	19.01
West Virginia:										
Barbour	2	2	------	------	2	33,780	11	73	825	40.93
Boone	4	6	------	------	6	312,300	49	209	10,266	30.42
Brooke	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Clay	1	1	------	------	------	10,978	2	193	419	26.19
Fayette	6	7	------	------	5	263,383	62	215	13,249	19.88
Gilmer	2	2	------	------	2	116,781	7	178	1,330	87.79
Harrison	16	18	1	------	18	644,111	106	222	23,602	27.29
Kanawha	11	14	6	2	12	714,719	141	194	27,394	26.09
Lewis	5	5	------	------	7	244,635	19	218	4,167	58.71
Logan	6	7	2	3	10	308,068	100	116	11,577	26.61
McDowell	11	14	------	------	7	351,137	122	100	12,218	28.74
Mercer	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mingo	5	6	2	2	7	399,973	84	178	14,952	26.75
Nicholas	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Putnam	1	1	------	------	------	29,825	6	153	979	30.46
Raleigh	7	9	------	------	6	144,239	33	158	5,153	27.99
Randolph	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Taylor	2	1	------	------	------	12,381	2	193	473	26.19
Upshur	1	1	------	------	1	6,200	1	193	237	26.19
Wyoming	6	9	------	7	2	169,383	32	216	7,014	24.15
Other counties	7	10	1	------	6	256,500	33	212	7,000	36.64
Total West Virginia	93	113	12	14	91	4,018,393	810	174	140,855	28.53
Total United States	271	304	23	36	171	7,946,237	1,948	156	303,400	26.19

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[1] Included in "Other counties" to avoid disclosing individual operations.

TABLE 31.—Units of coal-recovery augers sold to bituminous-coal and lignite mines for surface use in the United States, as reported by manufacturers, 1945–52 and 1953–57, by States

State	1945–52 [1]	1953	1954	1955	1956	1957
Alabama	---------	---------	1	---------	---------	---------
Colorado	---------	---------	---------	1	---------	---------
Illinois	---------	---------	---------	1	2	---------
Kentucky	---------	5	10	11	15	16
Maryland	---------	1	---------	---------	---------	---------
Missouri	---------	---------	---------	---------	---------	1
Ohio	---------	11	12	5	12	7
Pennsylvania	---------	8	9	8	10	7
Tennessee	---------	2	---------	---------	2	1
Virginia	---------	2	1	6	7	5
West Virginia	---------	26	21	33	41	16
Total	259	55	54	65	89	53

[1] Separate data by years and States not available.

MECHANICAL LOADING

In the past decade mechanical loading of bituminous coal and lignite at underground mines has increased from 61 to 85 percent of the total output. Although overall mechanization gained gradually during this period, the following changes occurred in loading methods: Mobile loading into mine cars decreased from 52 to 8 percent of the total mechanically loaded; mobile loading into shuttle cars increased from 22 to 65 percent; Duckbills or other self-loading conveyors decreased from 7 to 1 percent; hand-loaded conveyors decreased from 15 to 4 percent; and continuous-mining machines, first used in 1948, handled 18 percent of the total mechanically loaded output in 1957.

The most important change that has taken place in mechanical loading in recent years was introduction of continuous-mining machines. In 1957, 54 million tons of bituminous coal was produced at 193 mines by continuous-mining machines. Thirty-three of these mines used continuous-mining machines exclusively and produced 12 million tons in 1957 compared with 9 million tons in 1956 from 24 mines. Productivity at these 33 mines using continuous mining only averaged 12 tons per man per day compared with approximately 9 tons per man per day at all underground mines. Continuous-mining productivity in 1956 is described in detail in Mining Congress Journal for May 1958.

Sales of continuous-mining machines and haulage conveyors increased in 1957 over 1956. All other types of loading and mining equipment shipped to bituminous-coal and lignite mines, as reported by manufacturers, decreased in 1957 from 1956.

TABLE 32.—Growth of mechanical loading at underground bituminous-coal and lignite mines in the United States, 1923–57

(Production in thousand net tons)

Year	Underground production mechanically loaded									Underground production mechanically loaded, percent	Number of mechanical loading units					
	Loaded by machines				Continuous mining machines	Handled by conveyors			Total mechanically loaded		Mobile loading machines	Scrapers	Conveyors equipped with Duckbills or other self-loading heads	Continuous mining machines	Pit-car loaders	Hand-loaded conveyors
	Mobile loading machines	Scrapers	Conveyors equipped with Duckbills or other self-loading heads	Total		Pit-car loaders	Hand-loaded conveyors	Total								
1923	(1)	(1)	(1)	(1)	----------	(1)	(1)	(1)	[2] 1,880	[2] 0.3	(1)	(1)	(1)	----------	(1)	(1)
1924	(1)	(1)	(1)	(1)	----------	(1)	(1)	(1)	[2] 3,496	[2] .7	(1)	(1)	(1)	----------	(1)	(1)
1925	(1)	(1)	(1)	(1)	----------	(1)	(1)	(1)	[2] 6,243	[2] 1.2	(1)	(1)	(1)	----------	(1)	(1)
1926	7,786	1,554	682	10,022	----------	523	(1)	(1)	[2] 10,545	[2] 1.9	295	133	27	----------	(1)	(1)
1927	(1)	(1)	(1)	(1)	----------	(1)	(1)	(1)	16,500	3.3	(1)	(1)	(1)	----------	(1)	(1)
1928	11,811	1,548	1,200	14,559	----------	4,117	2,883	7,000	21,559	4.5	397	130	82	----------	1,040	(1)
1929	16,432	1,550	1,309	19,291	----------	14,979	3,592	18,571	37,862	7.4	488	126	99	----------	2,521	(1)
1930	20,073	1,637	1,628	23,338	----------	19,116	4,528	23,644	46,982	10.5	545	150	140	----------	2,876	(1)
1931	19,407	1,471	1,811	22,689	----------	19,172	5,701	24,873	47,562	13.1	583	146	165	----------	3,428	(1)
1932	14,825	1,132	1,630	17,587	----------	12,590	5,640	18,230	35,817	12.3	548	128	159	----------	3,112	(1)
1933	17,865	991	1,656	20,512	----------	11,413	5,896	17,309	37,821	12.0	523	93	132	----------	2,453	525
1934	20,750	1,004	2,082	23,836	----------	11,089	6,508	17,597	41,433	12.2	534	119	157	----------	2,288	574
1935	24,675	1,118	2,595	28,388	----------	11,098	7,691	18,789	47,177	13.5	657	78	179	----------	2,098	670
1936	40,970	1,273	3,240	45,483	----------	10,538	10,956	21,494	66,977	16.3	980	106	234	----------	1,851	936
1937	(1)	(1)	(1)	(1)	----------	(1)	(1)	(1)	83,500	20.2	(1)	(1)	(1)	----------	(1)	(1)
1938	57,824	1,031	4,248	63,103	----------	5,653	16,337	21,990	85,093	26.7	1,405	117	346	----------	1,392	1,526
1939	76,442	1,007	6,759	84,208	----------	5,038	21,466	26,504	110,712	31.0	1,573	131	559	----------	873	1,834
1940	100,962	1,255	10,362	112,579	----------	3,979	31,312	35,291	147,870	35.4	1,720	116	656	----------	697	2,263
1941	126,478	1,290	14,918	142,686	----------	3,447	40,534	43,981	186,667	40.7	1,985	109	788	----------	607	2,807
1942	160,301	1,405	20,683	182,389	----------	3,252	47,262	50,514	232,903	45.2	2,301	93	1,062	----------	481	3,041
1943	179,008	1,349	22,917	203,274	----------	2,669	43,862	46,531	249,805	48.9	2,525	83	1,226	----------	321	3,191
1944	202,875	1,341	23,164	227,380	----------	1,835	44,974	46,809	274,189	52.9	2,737	87	1,331	----------	241	3,236
1945	198,668	1,252	21,506	221,426	----------	986	40,100	41,086	262,512	56.1	2,950	87	1,383	----------	142	3,385
1946	186,975	917	19,678	207,570	----------	623	37,148	37,771	245,341	58.3	3,200	75	1,521	----------	93	3,470
1947	229,836	854	21,921	252,611	----------	353	45,193	45,546	298,157	60.7	3,569	67	1,531	----------	71	3,979

1948	[3] 232,667	743	19,634	253,044	(4)	184	42,578	42,762	295,806	64.3	[3] 3,980	56	1,632	(4)	37	4,125
1949	[3] 177,239	339	13,994	191,572	(4)	54	30,750	30,804	222,376	67.0	[3] 4,205	46	1,483	(4)	17	4,312
1950	[3] 222,976	318	13,985	237,279	(4)	39	35,407	35,446	272,725	69.4	[3] 4,318	39	1,329	(4)	12	4,434
1951	[5] 252,663	126	13,884	266,673	(4)	(6)	37,583	37,583	304,256	73.1	[5] 4,410	22	1,242	(4)	(6)	3,904
1952	218,982	77	10,590	229,649	8,215	(6)	31,130	31,130	268,994	75.5	4,083	19	1,049	152	(6)	3,569
1953	232,585	239	8,531	241,355	11,830	(6)	25,144	25,144	278,329	79.6	3,985	29	849	219	(6)	2,994
1954	206,546	411	4,672	211,629	16,336	(6)	15,005	15,005	242,970	84.0	4,314	48	633	325	(6)	2,162
1955	243,204	141	4,369	247,714	27,460	(6)	15,497	15,497	290,671	84.6	3,819	23	487	385	(6)	1,925
1956	248,341	156	3,727	252,224	39,907	(6)	15,271	15,271	307,402	84.0	3,854	35	437	510	(6)	1,819
1957	236,720	82	2,699	239,501	53,783	(6)	12,453	12,453	305,737	84.8	3,755	14	361	614	(6)	1,528

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[1] Data not available.
[2] Exclusive of tonnage "Handled by conveyors."
[3] Includes continuous-mining machines.
[4] Included with mobile loading machines.
[5] Includes continuous-mining machines and augers.
[6] Canvass of pit-car loaders discontinued in 1951.

TABLE 33.—Bituminous coal and lignite mechanically loaded underground in the United States, 1956–57, by types of loading equipment

Type of equipment	1956		1957	
	Net tons	Percentage of total	Net tons	Percentage of total
Mobile loading machines:				
Loading direct into mine cars	35, 428, 276	11. 5	24, 796, 785	8. 1
Loading onto conveyors	14, 069, 160	4. 6	14, 418, 819	4. 7
Loading into shuttle cars	198, 843, 677	64. 7	197, 505, 881	64. 6
Continuous-mining machines	39, 906, 323	13. 0	53, 782, 910	17. 6
Scrapers	156, 050	------------	81, 702	------------
Conveyors equipped with Duckbills or other self-loading heads	3, 726, 958	1. 2	2, 698, 796	. 9
Hand-loaded conveyors	15, 271, 104	5. 0	12, 452, 572	4. 1
Total mechanically loaded	307, 401, 548	100. 0	305, 737, 465	100. 0

TABLE 34.—Comparative changes in underground mechanical loading of bituminous coal and lignite by principal types of loading devices in the United States, 1956–57, by States

State	Net tons by—						Total mechanically loaded (net tons)		Total production at mines using mechanical loading devices (net tons)		Handled by each class (percent)					
	Loading machines [1]		Continuous-mining machines		Hand-loaded conveyors						Loading machines [1]		Continuous-mining machines		Hand-loaded conveyors	
	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957
Alabama	7,494,663	8,540,245	1,155,721	1,224,996	595,011	660,618	9,245,395	10,425,859	9,320,638	10,456,565	81.1	81.9	12.5	11.8	6.4	6.3
Alaska	92,470	58,615	16,365	12,865	31,531	------	140,366	71,480	262,805	251,098	65.9	82.0	11.6	18.0	22.5	------
Arkansas	------	------	28,244	30,900	295,870	245,991	324,114	276,891	324,114	276,891	------	------	8.7	11.2	91.3	88.8
Colorado	2,249,830	2,348,903	95,529	190,144	192,462	315,691	2,537,821	2,854,738	2,946,095	3,118,484	88.6	82.3	3.8	6.7	7.6	11.0
Illinois	23,313,257	20,848,568	4,770,353	5,877,774	------	------	28,083,610	26,726,342	28,104,512	26,737,016	83.0	78.0	17.0	22.0	------	------
Indiana	4,955,455	4,570,493	100,957	281,074	------	------	5,056,412	4,851,567	5,056,412	4,851,567	98.0	94.2	2.0	5.8	------	------
Iowa	65,978	89,391	------	------	------	------	65,978	89,391	65,978	90,941	100.0	100.0	------	------	------	------
Kentucky	37,074,600	35,231,945	1,264,731	2,320,504	1,467,859	877,826	39,807,190	38,430,275	41,562,509	39,346,921	93.1	91.7	3.2	6.0	3.7	2.3
Maryland	------	------	------	------	123,740	121,312	123,740	121,312	125,413	122,995	------	------	------	------	100.0	100.0
Montana:																
Bituminous	349,955	203,033	------	------	3,230	1,078	353,185	204,111	353,185	204,111	99.1	99.5	------	------	.9	.5
Lignite	3,200	1,260	------	------	------	------	3,200	1,260	4,512	2,521	100.0	100.0	------	------	------	------
Total Montana	353,155	204,293	------	------	3,230	1,078	356,385	205,371	357,697	206,632	99.1	99.5	------	------	.9	.5
New Mexico	55,951	27,206	------	------	950	900	56,901	28,106	63,334	38,633	98.3	96.8	------	------	1.7	3.2
North Dakota (lignite)	2,464	------	------	------	------	------	2,464	------	2,464	------	100.0	------	------	------	------	------
Ohio	9,999,283	7,241,998	2,007,835	3,334,812	138,907	99,889	12,146,025	10,676,699	12,208,237	10,689,475	82.3	67.8	16.5	31.2	1.2	1.0
Oklahoma	57,044	52,460	------	------	407,460	369,611	464,504	422,071	464,504	422,071	12.3	12.4	------	------	87.7	87.6
Pennsylvania	39,060,296	34,398,255	17,486,880	21,103,601	3,772,409	2,964,012	60,319,585	58,465,868	60,996,526	58,847,563	64.8	58.8	29.0	36.1	6.2	5.1
Tennessee	2,682,210	2,380,869	24,713	------	175,961	69,645	2,882,884	2,450,514	2,889,584	2,451,184	93.0	97.2	.9	------	6.1	2.8
Utah	5,910,519	5,856,999	583,069	991,383	17,566	1,825	6,511,154	6,850,207	6,511,154	6,850,207	90.8	85.5	8.9	14.5	.3	------
Virginia	12,720,823	13,560,056	957,215	1,502,505	208,092	251,898	13,886,130	15,314,459	14,967,370	15,879,390	91.6	88.6	6.9	9.8	1.5	1.6
Washington	98,358	49,355	230,211	138,024	82,530	105,682	411,099	293,061	413,254	322,992	23.9	16.8	56.0	47.1	20.1	36.1
West Virginia	105,143,239	103,495,381	11,138,312	16,732,110	7,681,591	6,323,056	123,963,142	126,550,547	128,035,949	128,801,608	84.8	81.8	9.0	13.2	6.2	5.0
Wyoming	894,526	546,951	46,188	42,218	75,935	43,538	1,016,649	632,707	1,020,099	632,707	88.0	86.4	4.5	6.7	7.5	6.9
Total	252,224,121	239,501,983	39,906,323	53,782,910	15,271,104	12,452,572	307,401,548	305,737,465	315,698,648	310,394,940	82.0	78.3	13.0	17.6	5.0	4.1

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[1] Includes mobile loading machines, scrapers, and conveyors equipped with Duckbills or other self-loading heads.

TABLE 35.—Number of underground bituminous-coal and lignite mines using mechanical loading devices and number of units in use in the United States, 1956–57, by States

State	Number of mines										Number of loading devices									
	Using loading machines only [1]		Using continuous-mining machines only		Using hand-loaded conveyors only		Using more than one type of mechanical loading		Total		Loading machines						Continuous-mining machines		Hand-loaded conveyors (number of units)	
											Mobile loading machines		Scrapers		Duckbills or other self-loading conveyors					
	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957
Alabama	15	14	------	------	9	12	5	5	29	31	115	117	------	------	5	4	10	12	79	100
Alaska	2	1	------	------	------	------	2	1	4	2	6	5	13	1	5	8	2	1	6	------
Arkansas	------	------	------	------	7	10	1	1	8	11	------	------	------	------	------	------	1	1	25	22
Colorado	36	34	1	------	17	17	8	9	62	60	47	60	6	2	109	103	5	9	48	53
Illinois	51	51	2	2	------	------	5	5	58	58	200	179	------	------	8	8	35	38	------	------
Indiana	23	22	------	------	------	------	1	2	24	24	70	78	------	------	------	------	3	4	------	------
Iowa	3	3	------	------	------	------	------	------	3	3	4	5	------	------	------	------	------	------	------	------
Kentucky	133	133	2	2	25	20	13	18	173	173	532	574	------	------	10	3	16	30	169	97
Maryland	------	------	------	------	6	7	------	------	6	7	------	------	------	------	------	------	------	------	15	18
Montana:																				
Bituminous	8	8	------	------	1	1	------	------	9	9	16	9	------	------	6	8	------	------	1	1
Lignite	1	1	------	------	------	------	------	------	1	1	2	2	------	------	------	------	------	------	------	------
Total Montana	9	9	------	------	1	1	------	------	10	10	18	11	------	------	6	8	------	------	1	1
New Mexico	1	1	------	------	1	1	------	------	2	2	2	2	------	------	------	------	------	------	1	1
North Dakota (lignite)	1	------	------	------	------	------	------	------	1	------	1	------	------	------	------	------	------	------	------	------
Ohio	28	24	3	4	19	10	4	5	54	43	141	117	------	------	6	1	23	34	31	20
Oklahoma	------	------	------	------	4	4	1	1	5	5	5	5	------	------	------	------	------	------	80	78
Pennsylvania	84	73	8	9	113	117	61	61	266	260	843	794	3	2	91	71	248	291	461	438
Tennessee	15	16	------	------	5	2	1	1	21	19	44	35	------	1	16	14	1	------	25	11
Utah	32	32	1	1	1	1	7	6	41	40	131	152	------	------	7	6	12	16	7	2
Virginia	59	49	------	1	6	6	5	8	70	64	187	171	------	------	7	2	11	18	26	23
Washington	3	3	------	1	------	------	2	1	5	5	4	3	7	2	------	------	6	6	32	20
West Virginia	243	235	6	12	74	63	65	68	388	378	1,471	1,420	------	------	75	40	135	152	792	626
Wyoming	8	5	1	1	1	------	2	2	12	8	33	27	6	6	92	93	2	2	21	18
Total	746	705	24	33	289	271	183	194	1,242	1,203	3,854	3,755	35	14	437	361	510	614	1,819	1,528

[1] Includes mobile loading machines, scrapers, and conveyors equipped with Duckbills or other self-loading heads.

TABLE 36.—Underground production at bituminous-coal and lignite mines in the United States, 1956–57, by States and methods of loading

State	Hand-loaded (net tons)		Mechanically loaded (net tons)		Total underground production (net tons)		Underground output hand-loaded (percent)		Underground output mechanically loaded (percent)	
	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957
Alabama	1,152,429	652,437	9,245,395	10,425,859	10,397,824	11,078,296	11.1	5.9	88.9	94.1
Alaska	123,640	226,264	140,366	71,480	264,006	297,744	46.8	76.0	53.2	24.0
Arizona	10,060	8,901	----------	----------	10,060	8,901	100.0	100.0	----------	----------
Arkansas	11,468	9,984	324,114	276,891	335,582	286,875	3.4	3.5	96.6	96.5
Colorado	606,023	375,759	2,537,821	2,854,738	3,143,844	3,230,497	19.3	11.6	80.7	88.4
Georgia	6,177	13,464	----------	----------	6,177	13,464	100.0	100.0	----------	----------
Illinois	343,095	267,339	28,083,610	26,726,342	28,426,705	26,993,681	1.2	1.0	98.8	99.0
Indiana	118,625	98,479	5,056,412	4,851,567	5,175,037	4,950,046	2.3	2.0	97.7	98.0
Iowa	207,743	183,798	65,978	89,391	273,721	273,189	75.9	67.3	24.1	32.7
Kansas	13,023	11,324	----------	----------	13,023	11,324	100.0	100.0	----------	----------
Kentucky	17,180,159	17,083,851	39,807,190	38,430,275	56,987,349	55,514,126	30.1	30.8	69.9	69.2
Maryland	215,051	204,422	123,740	121,312	338,791	325,734	63.5	62.8	36.5	37.2
Missouri	139,948	100,885	----------	----------	139,948	100,885	100.0	100.0	----------	----------
Montana:										
Bituminous	25,414	17,107	353,185	204,111	378,599	221,218	6.7	7.7	93.3	92.3
Lignite	14,271	15,122	3,200	1,260	17,471	16,382	81.7	92.3	18.3	7.7
Total Montana	39,685	32,229	356,385	205,371	396,070	237,600	10.0	13.6	90.0	86.4
New Mexico	89,867	94,310	56,901	28,106	146,768	122,416	61.2	77.0	38.8	23.0
North Dakota (lignite)	6,548	4,018	2,464	----------	9,012	4,018	72.7	100.0	27.3	----------
Ohio	1,277,746	1,087,351	12,146,025	10,676,699	13,423,771	11,764,050	9.5	9.2	90.5	90.8
Oklahoma	26,629	17,939	464,504	422,071	491,133	440,010	5.4	4.1	94.6	95.9
Pennsylvania	6,168,977	5,312,059	60,319,585	58,465,868	66,488,562	63,777,927	9.3	8.3	90.7	91.7
Tennessee	3,672,224	2,594,987	2,882,884	2,450,514	6,555,108	5,045,501	56.0	51.4	44.0	48.6
Utah	11,010	8,090	6,511,154	6,850,207	6,522,164	6,858,297	.2	.1	99.8	99.9
Virginia	11,602,636	11,746,657	13,886,130	15,314,459	25,488,766	27,061,116	45.5	43.4	54.5	56.6
Washington	31,108	50,400	411,099	293,061	442,207	343,461	7.0	14.7	93.0	85.3
West Virginia	15,309,508	14,709,677	123,963,142	126,550,547	139,272,650	141,260,224	11.0	10.4	89.0	89.6
Wyoming	9,116	17,052	1,016,649	632,707	1,025,765	649,759	.9	2.6	99.1	97.4
Total	58,372,495	54,911,676	307,401,548	305,737,465	365,774,043	360,649,141	16.0	15.2	84.0	84.8

TABLE 37.—Units of mechanical loading equipment sold to bituminous-coal and lignite mines for underground use in the United States, as reported by manufacturers, 1948–57

Type of equipment	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	Change from 1956 (percent)
Mobile loading machines	[1] 723	[1] 286	[1] 289	[1] 287	[1] 206	180	92	120	239	209	−12.6
Continuous-mining machines	(1)	(1)	(1)	(1)	(1)	67	101	109	154	168	+9.1
Scrapers	17	8	1	4	8	11	5	------	------	------	------
Conveyors [2]	1,025	394	316	297	155	87	61	143	232	159	−31.5
Total	1,765	688	606	588	369	345	259	372	625	536	−14.2
Number of manufacturers reporting	22	22	20	21	22	25	23	22	22	21	------

[1] Continuous-mining machines included with mobile loading machines.

[2] Includes hand-loaded conveyors and those equipped with Duckbills or other self-loading heads.

TABLE 38.—Units of mechanical loading equipment sold for use in bituminous-coal and lignite mines in the United States, as reported by manufacturers, 1956–57, by States

State	Mobile loading machines		Continuous-mining machines		Room conveyors [1]	
	1956	1957	1956	1957	1956	1957
Alabama	21	7	1	7	6	------
Alaska	------	------	------	------	------	1
Arkansas	------	------	------	------	------	1
Colorado	1	------	------	2	------	------
Illinois	1	1	9	3	------	------
Indiana	1	3	1	2	------	------
Kentucky	29	17	5	12	32	20
New Mexico	------	1	------	------	------	------
Ohio	2	------	8	8	5	------
Oklahoma	------	------	------	1	5	------
Pennsylvania	41	30	68	59	30	28
Tennessee	------	7	1	------	------	2
Utah	3	14	2	6	------	------
Virginia	14	14	3	11	6	5
West Virginia	125	115	56	57	148	102
Wyoming	1	------	------	------	------	------
Total	239	209	154	168	232	159

[1] Includes hand-loaded conveyors and those equipped with Duckbills or other self-loading heads.

TABLE 39.—Units of conveying equipment sold for use in bituminous-coal and lignite mines in the United States, as reported by manufacturers, 1956–57, by States

State	Bridge conveyors		Shuttle cars		"Mother" conveyors [1]	
	1956	1957	1956	1957	1956	1957
Alabama	6	7	33	49	7	2
Colorado	---	---	4	5	1	2
Illinois	4	---	9	4	12	6
Indiana	---	---	8	3	1	1
Kentucky	30	16	35	30	6	15
New Mexico	---	---	---	2	---	---
Ohio	10	---	10	---	9	16
Oklahoma	---	1	2	---	---	2
Pennsylvania	12	14	130	99	36	40
Tennessee	---	---	4	2	1	1
Utah	---	---	8	30	4	5
Virginia	3	7	40	21	7	9
West Virginia	63	51	275	241	53	73
Wyoming	---	---	2	2	---	---
Total	128	96	560	488	137	172

[1] Includes all haulage conveyors with capacity over 500 feet, except main-slope conveyors.

MECHANICAL CLEANING

Mechanical cleaning refers to cleaning raw coal with mechanical devices that separate out impurities, usually by differences in specific gravity; does not include coal that is screened only. Mechanical devices are divided into two general classes—wet and pneumatic. About 92 percent of the coal cleaned in 1957 was cleaned by various wet methods. Approximately half of all bituminous coal cleaned in the United States is cleaned with jigs. The various types of mechanical cleaning equipment are described in detail in Minerals Yearbook, volume II, Fuels, 1953, pages 94–96.

Mechanical cleaning of bituminous coal increased more rapidly at underground mines than at strip mines from 1953 to 1957; the percentage of total production cleaned at underground mines increased about 12 percent during this period, whereas at strip mines the increase was only 4 percent. Increased mechanical loading at underground mines was the major reason for the increased proportion of underground coal that required cleaning.

In the following tables on mechanical cleaning, where data are tabulated by States, the tonnage is credited to the State from which the coal was mined. The cleaning plant has been credited to the State where most of the coal was mined.

TABLE 40.—Growth of mechanical cleaning at bituminous-coal and lignite mines in the United States, 1927–57

Year	Total production (thousand tons)	Mechanical cleaning					Percentage of total production mechanically cleaned
		Number of cleaning plants	Raw coal (thousand tons)	Cleaned coal (thousand tons)	Refuse (thousand tons)	Percentage of refuse to raw coal	
1927	517,763	(1)	(1)	27,692	(1)	(1)	5.3
1928	500.745	236	(1)	28,783	(1)	(1)	5.7
1929	534,989	280	40,241	36,799	3,442	8.6	6.9
1930	467,526	297	42,645	38,800	3,845	9.0	8.3
1931	382,089	312	39,529	36,172	3,357	8.5	9.5
1932	309,710	309	32,903	30,278	2,625	8.0	9.8
1933	333,630	290	37,682	34,558	3,124	8.3	10.4
1934	359,368	293	43,556	39,827	3,729	8.6	11.1
1935	372,373	320	49,473	45,361	4,112	8.3	12.2
1936	439,088	342	67,162	61,095	6,067	9.0	13.9
1937	445,531	(1)	(1)	65,000	(1)	(1)	14.6
1938	348,545	374	71,207	63,455	7,752	10.9	18.2
1939	394,855	366	88,895	79,429	9,466	10.6	20.1
1940	460,771	387	115,692	102,270	13,422	11.6	22.2
1941	514,149	417	133,379	117,540	15,839	11.9	22.9
1942	582,693	438	162,598	142,187	20,411	12.6	24.4
1943	590,177	432	167,310	145,576	21,734	13.0	24.7
1944	619,576	439	182,071	158,727	23,344	12.8	25.6
1945	577,617	439	172,899	147,886	25,013	14.5	25.6
1946	533,922	445	163,633	138,670	24,963	15.3	26.0
1947	630,624	461	206.620	174,436	32,184	15.6	27.7
1948	599,518	502	215,217	180,880	34,337	16.0	30.2
1949	437,868	571	184,691	153,652	31,039	16.8	35.1
1950	516,311	612	238,391	198,699	39,692	16.7	38.5
1951	533,665	631	289,838	240.010	49,828	17.2	45.0
1952	466,841	625	274,246	227,265	46,981	17.1	48.7
1953	457,290	611	295,654	241,759	53,895	18.2	52.9
1954	391,706	613	287.004	232.764	54,240	18.9	59.4
1955	464,633	575	335,458	272,715	62,743	18.7	58.7
1956	500,874	583	359,378	292,365	67,013	18.6	58.4
1957	492,704	593	376,546	304,027	72,519	19.3	61.7

[1] Data not available.

TABLE 41.—Mechanical cleaning at bituminous-coal and lignite mines in the United States, 1957, by States

State	Total production (net tons)	Mechanical cleaning					Percentage of total production mechanically cleaned
		Number of cleaning plants	Raw coal (net tons)	Cleaned coal (net tons)	Refuse (net tons)	Percentage of refuse to raw coal	
Alabama	13,259,502	34	19,658,619	12,417,096	7,241,523	36.8	93.6
Alaska	842,338	3	463,923	311,136	152,787	32.9	36.9
Arkansas	507,731	(1)	(1)	(1)	(1)	(1)	(1)
Colorado	3,593,629	[2] 5	[2] 1,700,666	[2] 1,394,913	[2] 305.753	[2] 18.0	[2] 38.8
Illinois	46,993,025	60	50,031,569	42.455,159	7,576,410	15.1	90.3
Indiana	15,841,288	21	13.630,726	11,587,572	2,043,154	15.0	73.1
Kansas	749,001	3	952,232	583,704	368,528	38.7	77.9
Kentucky	74.666,796	87	51,283,361	43,264.992	8,018,369	15.6	57.9
Missouri	2,975.722	11	3,727,168	2,744.594	982,574	26.4	92.2
Montana (bituminous)	387,329	2	11,631	10,531	1.100	9.5	2.7
New Mexico	137.151	1	26.192	21,646	4,546	17.4	15.8
Ohio	36,861,607	26	20,634.618	16,657,808	3,976,810	19.3	45.2
Oklahoma	2,195,259	3	704,567	600.522	104,045	14.8	27.4
Pennsylvania	85,365,254	99	65,854.857	52,601,639	13,253.218	20.1	61.6
Tennessee	7,955,088	4	791,013	722,462	68,551	8.7	9.1
Utah	6,858,297	5	3,732,688	2.986,881	745,807	20.0	43.6
Virginia	29,505,579	30	15,972.872	13,304,259	2,668,613	16.7	45.1
Washington	360,336	4	573,494	336,070	237,424	41.4	93.3
West Virginia	156,842,038	194	126,786,281	102.017,793	24,768,488	19.5	65.0
Wyoming	2,117,266	1	9,259	8,417	842	9.1	.4
Other States [3]	4,689,680	----------	----------	----------	----------	----------	----------
Total	492,703,916	593	376,545,736	304.027,194	72.518,542	19.3	61.7

[1] Included in Colorado.

[2] Includes Arkansas.

[3] Includes Arizona, Georgia, Iowa, Maryland, Montana lignite, North Dakota lignite, and South Dakota lignite.

TABLE 42.—Mechanical cleaning of bituminous coal and lignite in the United States, 1927–57, by types of equipment

Year	Wet methods								Pneumatic methods	Total
	Jigs	Concentrating tables	Classifiers	Launders	Dense-medium processes	Jigs and tables	Other combinations	Total		
CLEAN COAL (THOUSAND NET TONS)										
1927	18,741	3,200	(1)	[1] 1,000	(1)	300	800	24,041	3,651	27,692
1928	17,927	3,412	(1)	[1] 2,446	(1)	1,056	156	24,997	3,786	28,783
1929	18,915	3,532	(1)	[1] 7,103	(1)	1,214	191	30,955	5,844	36,799
1930	17,724	2,272	(1)	[1] 9,818	(1)	1,029	62	30,905	7,895	38,800
1931	13,957	1,551	(1)	[1] 11,213	(1)	926	11	27,658	8,514	36,172
1932	9,963	821	(1)	[1] 12,140	(1)	806	9	23,739	6,539	30,278
1933	11,895	1,119	(1)	[1] 13,272	(1)	693	5	26,984	7,574	34,558
1934	14,012	1,116	(1)	[1] 15,168	(1)	1,227	6	31,529	8,298	39,827
1935	15,735	1,118	(1)	[1] 18,454	(1)	1,549	---------	36,856	8,505	45,361
1936	23,417	1,843	(1)	[1] 22,631	(1)	2,613	---------	50,504	10,591	61,095
1937	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	65,000
1938	27,615	984	4,521	10,681	4,450	2,791	2,145	53,187	10,268	63,455
1939	37,056	1,402	5,917	12,809	4,683	3,256	2,611	67,734	11,695	79,429
1940	47,064	2,330	7,762	16,269	6,692	2,765	4,408	87,290	14,980	102,270
1941	53,287	2,510	8,177	16,954	9,344	4,364	5,742	100,378	17,162	117,540
1942	66,876	3,138	10,529	18,658	12,495	4,366	5,938	122,000	20,187	142,187
1943	66,092	2,929	11,854	17,424	13,388	4,322	8,366	124,375	21,201	145,576
1944	74,175	2,753	14,780	19,686	13,869	4,649	8,751	138,663	20,064	158,727
1945	68,609	2,594	14,203	18,980	12,875	4,754	8,455	130,470	17,416	147,886
1946	64,702	1,447	13,883	16,021	14,173	3,776	8,057	122,059	16,611	138,670
1947	85,931	2,980	14,648	17,902	17,702	4,303	12,617	156,083	18,353	174,436
1948	87,506	4,360	18,304	16,788	20,638	5,252	11,816	164,664	16,216	180,880
1949	72,423	4,040	14,865	11,238	17,821	3,288	17,033	140,708	12,944	153,652
1950	94,161	4,693	18,059	11,630	28,948	6,153	19,526	183,170	15,529	198,699
1951	101,746	5,811	23,174	10,362	33,840	7,613	38,884	221,430	18,580	240,010
1952	97,336	3,723	19,296	11,738	31,321	8,280	36,925	208,619	18,646	227,265
1953	101,001	4,002	18,312	11,988	36,805	8,647	41,739	222,494	19,265	241,759
1954	99,913	6,606	16,115	12,156	43,104	9,024	27,119	214,037	18,727	232,764
1955	114,538	7,443	17,656	11,400	49,332	13,953	38,098	252,420	20,295	272,715
1956	124,858	9,535	15,064	10,223	56,937	10,978	40,459	268,054	24,311	292,365
1957	133,844	14,389	14,282	8,306	6,678	11,557	33,203	279,259	24,768	304,027
PERCENTAGE CLEANED BY EACH TYPE										
1927	67.6	11.6	(1)	[1] 3.6	(1)	1.1	2.9	86.8	13.2	100.0
1928	62.3	11.8	(1)	[1] 8.5	(1)	3.7	.5	86.8	13.2	100.0
1929	51.4	9.6	(1)	[1] 19.3	(1)	3.3	.5	84.1	15.9	100.0
1930	45.6	5.9	(1)	[1] 25.3	(1)	2.7	.2	79.7	20.3	100.0
1931	38.6	4.3	(1)	[1] 31.0	(1)	2.6	---------	76.5	23.5	100.0
1932	32.8	2.7	(1)	[1] 40.2	(1)	2.7	---------	78.4	21.6	100.0
1933	34.4	3.2	(1)	[1] 38.5	(1)	2.0	---------	78.1	21.9	100.0
1934	35.2	2.8	(1)	[1] 38.1	(1)	3.1	---------	79.2	20.8	100.0
1935	34.7	2.5	(1)	[1] 40.7	(1)	3.4	---------	81.3	18.7	100.0
1936	38.3	3.0	(1)	[1] 37.1	(1)	4.3	---------	82.7	17.3	100.0
1937	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	100.0
1938	43.5	1.6	7.1	16.8	7.0	4.4	3.4	83.8	16.2	100.0
1939	46.6	1.8	7.5	16.1	5.9	4.1	3.3	85.3	14.7	100.0
1940	46.0	2.3	7.6	15.9	6.5	2.7	4.3	85.3	14.7	100.0
1941	45.3	2.2	7.0	14.4	7.9	3.7	4.9	85.4	14.6	100.0
1942	47.0	2.2	7.4	13.1	8.8	3.1	4.2	85.8	14.2	100.0
1943	45.4	2.0	8.1	12.0	9.2	3.0	5.7	85.4	14.6	100.0
1944	46.7	1.8	9.3	12.4	8.8	2.9	5.5	87.4	12.6	100.0
1945	46.4	1.8	9.6	12.8	8.7	3.2	5.7	88.2	11.8	100.0
1946	46.7	1.0	10.0	11.6	10.2	2.7	5.8	88.0	12.0	100.0
1947	49.3	1.7	8.4	10.3	10.1	2.5	7.2	89.5	10.5	100.0
1948	48.4	2.4	10.1	9.3	11.4	2.9	6.5	91.0	9.0	100.0
1949	47.1	2.6	9.7	7.3	11.6	2.2	11.1	91.6	8.4	100.0
1950	47.4	2.4	9.1	5.8	14.6	3.1	9.8	92.2	7.8	100.0
1951	42.4	2.4	9.7	4.3	14.1	3.2	16.2	92.3	7.7	100.0
1952	42.8	1.6	8.5	5.2	13.8	3.6	16.3	91.8	8.2	100.0
1953	41.8	1.6	7.6	4.9	15.2	3.6	17.3	92.0	8.0	100.0
1954	42.8	3.0	5.7	3.9	21.8	3.5	14.4	95.1	4.9	100.0
1955	42.0	2.7	6.5	4.2	18.1	5.1	14.0	92.6	7.4	100.0
1956	42.7	3.3	5.1	3.5	19.5	3.8	13.8	91.7	8.3	100.0
1957	44.0	4.8	4.7	2.7	21.0	3.8	10.9	91.9	8.1	100.0

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[1] Launders include classifiers and dense medium processes for 1927–36.
[2] Data not available.

TABLE 43.—Mechanical cleaning at bituminous-coal and lignite mines in the United States, 1954–57, by underground, strip, and auger mining

Type of mining	1954	1955	1956	1957
Underground mines:				
Total production.....net tons..	289, 112, 031	343, 465, 239	365, 774, 043	360, 649, 141
Cleaned.....do....	184, 372, 053	217, 199, 126	232, 231, 914	242, 981, 446
Cleaned.....percent..	63. 8	63. 2	63. 5	67. 4
Strip mines:				
Total production.....net tons..	98, 134, 250	115, 092, 769	127, 055, 382	124, 108, 538
Cleaned.....do....	47, 772, 295	54, 423, 341	58, 271, 513	59, 317, 324
Cleaned.....percent..	48. 7	47. 3	45. 9	47. 8
Auger mines:				
Total production.....net tons..	4, 460, 019	6, 075, 400	8, 044, 652	7, 946, 237
Cleaned.....do....	619, 675	1, 093, 017	1, 861, 957	1, 728, 424
Cleaned.....percent..	13. 9	18. 0	23. 1	21. 8
Total, all mines:				
Total production.....net tons..	391, 706, 300	464, 633, 408	500, 874, 077	492, 703, 916
Cleaned.....do....	232, 764, 023	272, 715, 484	292, 365, 384	304, 027, 194
Cleaned.....percent..	59. 4	58. 7	58. 4	61. 7

TABLE 44.—Mechanical cleaning at bituminous-coal and lignite mines in the United States, 1957, by States and by underground, strip, and auger mining

State	Underground mines			Strip mines		
	Total production	Mechanically cleaned	Percentage cleaned	Total production	Mechanically cleaned	Percentage cleaned
Alabama	11,078,296	10,775,134	97.3	2,172,307	1,633,063	75.2
Alaska	297,744	45,670	15.3	544,594	265,466	48.7
Arkansas	286,875	(1)	(1)	220,856	(1)	(1)
Colorado	3,230,497	[2] 1,123,557	[2] 31.9	363,132	[2] 271,356	[2] 46.5
Illinois	26,993,681	23,454,584	86.9	19,999,344	19,000,575	95.0
Indiana	4,950,046	3,771,988	76.2	10,891,242	7,815,584	71.8
Kansas	11,324			737,677	583,704	79.1
Kentucky	55,514,126	30,281,044	54.5	17,612,792	12,947,810	73.5
Missouri	100,885	16,011	15.9	2,874,837	2,728,583	94.9
Montana (bituminous)	221,218	10,531	4.8	166,111		
New Mexico	122,416	21,646	17.7	14,735		
Ohio	11,764,050	8,801,026	74.8	23,956,629	7,547,090	31.5
Oklahoma	440,010	250,141	56.8	1,755,249	350,381	20.0
Pennsylvania	63,777,927	48,868,769	76.6	21,220,728	3,729,681	17.6
Tennessee	5,045,501	559,822	11.1	2,614,528	130,307	5.0
Utah	6,858,297	2,986,881	43.6			
Virginia	27,061,116	13,209,317	48.8	1,867,982	55,386	3.0
Washington	343,461	319,195	92.9	16,875	16,875	100.0
West Virginia	141,260,224	98,477,713	69.7	11,563,421	2,232,564	19.3
Wyoming	649,759	8,417	1.3	1,467,507		
Other States [3]	641,688			4,047,992		
Total	360,649,141	242,981,446	67.4	124,108,538	59,308,425	47.8

State	Auger mines			Total, all mines		
	Total production	Mechanically cleaned	Percentage cleaned	Total production	Mechanically cleaned	Percentage cleaned
Alabama	8,899	8,899	100.0	13,259,502	12,417,096	93.6
Alaska				842,338	311,136	36.9
Arkansas				507,731	(1)	(1)
Colorado				3,593,629	[2] 1,394,913	[2] 34.0
Illinois				46,993,025	42,455,159	90.3
Indiana				15,841,288	11,587,572	73.1
Kansas				749,001	583,704	77.9
Kentucky	1,539,878	36,138	2.3	74,666,796	43,264,992	57.9
Missouri				2,975,722	2,744,594	92.2
Montana (bituminous)				387,329	10,531	2.7
New Mexico				137,151	21,646	15.8
Ohio	1,140,928	309,692	27.1	36,861,607	16,657,808	45.2
Oklahoma				2,195,259	600,522	27.4
Pennsylvania	366,599	3,189	.9	85,365,254	52,601,639	61.6
Tennessee	295,059	32,333	11.0	7,955,088	722,462	9.1
Utah				6,858,297	2,986,881	43.6
Virginia	576,481	39,556	6.9	29,505,579	13,304,259	45.1
Washington				360,336	336,070	93.3
West Virginia	4,018,393	1,307,516	32.5	156,842,038	102,017,793	65.0
Wyoming				2,117,266	8,417	.4
Other States [3]				4,689,680		
Total	7,946,237	1,737,323	21.9	492,703,916	304,027,194	61.7

[1] Included in Colorado.
[2] Includes Arkansas.
[3] Includes Arizona, Georgia, Iowa, Maryland, Montana lignite, North Dakota lignite, and South Dakota lignite.

MECHANICAL CRUSHING

TABLE 45.—Mechanical crushing of bituminous coal and lignite at mines in the United States, 1940 and 1944–57 [1]

Year	Number of mines crushing coal	Coal crushed (net tons)	Percentage of production crushed at mines where crushing is done	Percentage of total production crushed	Percentage of production mechanically cleaned at mines where crushing is done
1940	716	35,251,061	19.3	7.7	(2)
1944	814	66,460,564	29.6	10.8	(2)
1945	830	70,936,898	32.4	12.3	(2)
1946	851	66,663,732	31.8	12.5	39.9
1947	904	88,985,858	35.7	14.1	41.4
1948	995	91,564,311	36.6	15.3	42.1
1949	1,120	77,327,691	39.0	17.7	47.3
1950	1,210	101,594,731	40.1	19.7	50.6
1951	1,374	118,663,712	39.6	22.2	54.8
1952	1,325	108,102,158	40.5	23.2	59.6
1953	1,239	116,493,415	42.5	25.5	62.7
1954	982	122,288,369	51.8	31.2	69.8
1955	1,225	161,470,318	52.8	34.8	68.4
1956	1,370	172,389,802	54.6	34.4	68.0
1957	1,452	173,098,257	52.5	35.0	70.5

[1] Data not available for 1941–43. Lignite and Virginia semianthractie mines not included in 1940–49.
[2] Data not available.

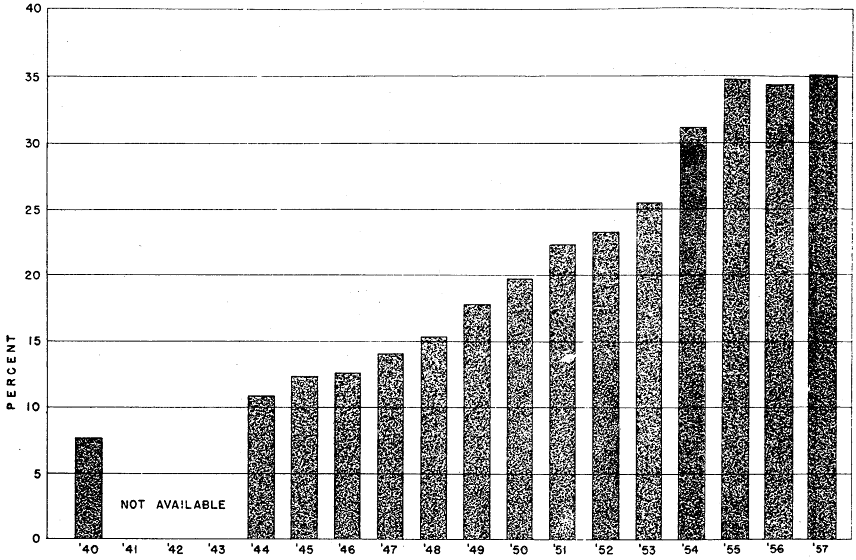

FIGURE 11.—Percentage of total production of bituminous coal and lignite crushed at mines in the United States, 1940 and 1944–57.

TABLE 46.—Mechanical crushing of bituminous coal and lignite at mines in the United States, 1956–57, by States

State	Number of mines crushing coal		Coal crushed (net tons)		Percentage of production crushed at mines where crushing is done		Percentage of total production crushed	
	1956	1957	1956	1957	1956	1957	1956	1957
Alabama	34	31	6, 766, 752	7, 476, 692	63. 5	64. 8	53. 4	56. 4
Alaska	6	7	455, 352	659, 214	82. 3	92. 9	62. 7	78. 3
Arizona	1	1	4, 700	3, 845	84. 5	81. 8	46. 7	43. 2
Arkansas	7	7	410, 786	251, 367	89. 4	90. 2	69. 6	49. 5
California	1	--------	12, 000	--------------	100. 0	--------	100. 0	--------
Colorado	54	53	1, 939, 871	2, 073, 648	65. 3	66. 9	55. 4	57. 7
Illinois	81	83	16, 628, 914	19, 600, 711	39. 7	47. 2	34. 6	41. 7
Indiana	36	37	7, 634, 964	7, 166, 162	49. 6	47. 7	44. 7	45. 2
Iowa	27	25	842, 153	735, 915	80. 5	75. 9	62. 0	56. 1
Kansas	4	4	615, 500	589, 572	97. 7	98. 4	69. 6	78. 7
Kentucky	132	146	22, 165, 595	23, 320, 679	53. 6	54. 3	29. 7	31. 2
Maryland	13	10	192, 912	252, 354	73. 8	87. 3	28. 8	33. 7
Missouri	12	14	1, 739, 304	1, 480, 101	60. 5	52. 8	53. 0	49. 7
Montana:								
Bituminous	7	6	91, 399	78, 752	13. 2	41. 4	11. 1	20. 3
Lignite	2	2	1, 600	1, 400	22. 7	24. 1	6. 2	5. 5
Total Montana	9	8	92, 999	80, 152	13. 3	40. 9	11. 0	19. 4
New Mexico	4	7	62, 932	40, 976	84. 0	72. 8	39. 7	29. 9
North Dakota (lignite)	20	19	2, 548, 245	2, 276, 584	94. 4	92. 6	90. 5	88. 9
Ohio	112	132	12, 186, 813	14, 549, 391	52. 5	55. 6	31. 3	39. 5
Oklahoma	14	12	1, 050, 788	1, 157, 191	81. 7	82. 8	52. 4	52. 7
Pennsylvania	376	348	36, 926, 200	36, 110, 471	64. 8	68. 1	40. 9	42. 3
South Dakota (lignite)	1	1	1, 000	800	4. 1	3. 8	4. 1	3. 8
Tennessee	20	19	1, 202, 457	1, 078, 025	64. 7	74. 6	13. 6	13. 6
Utah	36	41	3, 975, 914	4, 384, 723	69. 5	64. 6	61. 0	63. 9
Virginia	51	46	4, 439, 711	3, 754, 042	43. 5	41. 8	15. 8	12. 7
Washington	4	6	125, 482	66, 070	34. 4	19. 7	26. 6	18. 3
West Virginia	301	355	48, 748, 703	44, 696, 036	52. 8	41. 6	31. 3	28. 5
Wyoming	14	13	1, 619, 755	1, 293, 536	79. 6	79. 9	63. 4	61. 1
Total	1, 370	1, 425	172, 389, 802	173, 098, 257	54. 6	52. 5	34. 4	35. 1

TREATMENT FOR ALLAYING DUST

TABLE 47.—Summary data on treatment of bituminous-coal and lignite at mines for allaying dust in the United States, 1940–57 [1]

Year	Grand total production (net tons)	Total production at mines where coal was treated (net tons)	Percentage of production treated at mines where treating is done	Percentage of total production treated	Net tons treated with—				
					Calcium chloride	Oil	Calcium chloride and oil	All other materials	Total
1940	460,771,500	161,089,959	22.1	7.7	2,633,291	25,767,651	4,428,113	2,807,728	35,636,783
1941	514,149,245	197,476,343	20.0	7.7	3,957,459	29,258,462	2,482,899	3,844,476	39,543,296
1942	582,692,937	202,973,885	17.3	6.0	10,132,809	11,302,020	6,544,658	7,148,064	35,127,551
1943	590,177,069	153,863,052	17.3	4.5	15,049,176	1,720,176	1,947,219	7,966,484	26,683,055
1944	619,576,240	172,955,108	17.8	5.0	7,276.702	13,188,883	4,744,580	5,562,565	30,772,730
1945	577,617,327	166,935,955	20.1	5.8	5,115,090	18,875,674	4,647,872	4,910,602	33,549,238
1946	533,922,068	166,814,848	22.2	6.9	4,957,622	24,310,109	3,193,070	4,572,360	37,033,161
1947	630,623,722	195,840,059	26.4	8.2	5,822,483	34,667,571	5,571,953	5,732,101	51,794,108
1948	599,518,229	196,600,489	25.6	8.4	6,275,121	34,466,534	4,177,987	5,462,054	50,381,696
1949	437,868,036	160,978,742	26.0	9.5	3,670,120	30,448,670	4,380,961	3,275,151	41,774,902
1950	516,311,053	210,083,657	25.9	10.5	4,643,186	41,688,159	4,278,212	3,724,314	54,333,871
1951	533,664,732	228,802,637	25.6	11.0	4,694,938	46,142,726	4,587,940	3,172,205	58,597,809
1952	466,840,782	211,437,141	24.4	11.0	4,954,080	41,409,886	3,432,199	1,772,111	51,568,276
1953	457,290,449	206,374,498	23.7	10.7	3,362,552	40,671,431	2,769,833	2,154,985	48,958,801
1954	391,706,300	202,098,539	27.9	14.4	2,959,979	47,782,165	3,366,955	2,255,872	56,364,971
1955	464,633,408	236,115,318	26.5	13.5	3,160,729	51,157,769	5,696,447	2,513,752	62,528,697
1956	500,874,077	243,513,231	26.6	12.9	5,500,522	52,008,545	4,912,374	2,309,732	64,731,173
1957	492,703,916	241,733,935	25.6	12.5	4,112,934	52,051,076	3,809,132	1,852,051	61,825,193

Year	Number of mines treating with—					Percentage of tonnage treated with—				
	Calcium chloride	Oil	Calcium chloride and oil	All other materials	Total [2]	Calcium chloride	Oil	Calcium chloride and oil	All other materials	Total
1940	51	486	22	62	614	7.4	72.3	12.4	7.9	100.0
1941	67	564	15	58	668	10.0	74.0	6.3	9.7	100.0
1942	167	334	73	117	603	28.8	32.2	18.6	20.4	100.0
1943	212	67	28	101	393	56.4	6.4	7.3	29.9	100.0
1944	145	192	47	83	434	23.6	42.9	15.4	18.1	100.0
1945	105	296	43	67	487	15.2	56.3	13.9	14.6	100.0
1946	79	380	41	51	546	13.4	65.6	8.6	12.4	100.0

1947	67	384	58	45	546
1948	68	474	48	46	629
1949	91	586	62	34	769
1950	106	688	32	45	838
1951	98	764	40	27	898
1952	101	723	30	20	865
1953	81	681	28	26	785
1954	83	614	29	29	737
1955	63	650	33	28	757
1956	73	642	35	30	763
1957	71	665	31	34	785

1947	11.2	66.9	10.8	11.1	100.0
1948	12.5	68.4	8.3	10.8	100.0
1949	8.8	72.9	10.5	7.8	100.0
1950	8.5	76.7	7.9	6.9	100.0
1951	8.0	78.8	7.8	5.4	100.0
1952	9.6	80.3	6.7	3.4	100.0
1953	6.8	83.1	5.7	4.4	100.0
1954	5.2	84.8	6.0	4.0	100.0
1955	5.1	81.8	9.1	4.0	100.0
1956	8.5	80.3	7.6	3.6	100.0
1957	6.6	84.2	6.2	3.0	100.0

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[1] All items except "Grand total production" exclude lignite and semianthracite, 1940–49. Data for 1940–45 include all mines with an average daily production of 50 tons and all mines with rail or river connections regardless of size. Data for 1946–57 include all mines producing 1,000 or more tons. The figures are reasonably comparable for all years.

[2] Because some mines used more than 1 method of treatment, this total is not the sum of the individual items.

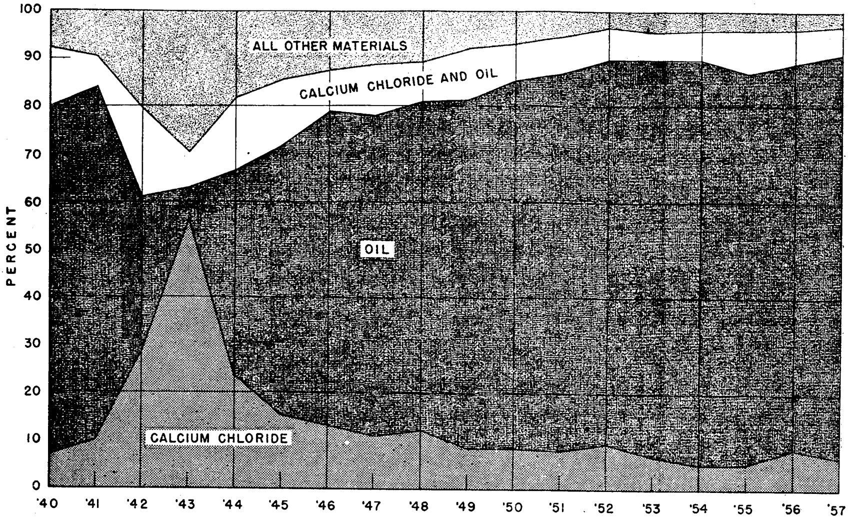

FIGURE 12.—Percentage of total bituminous coal and lignite treated for allaying dust at mines in the United States, 1940–57, by type of agent used.

TABLE 48.—Treatment of bituminous coal and lignite at mines for allaying dust, in the United States, 1956–57, by States

State	Number of mines treating coal		Coal treated (net tons)		Percentage of production treated at mines where treating is done		Percentage of total production treated	
	1956	1957	1956	1957	1956	1957	1956	1957
Alabama	5	9	59, 684	69, 429	10. 4	13. 4	0. 5	0. 5
Arkansas	4	5	20, 176	18, 244	12. 3	17. 0	3. 4	3. 6
Colorado	47	44	281, 466	292, 827	19. 5	20. 9	8. 0	8. 1
Illinois	79	80	6, 459, 444	5, 195, 685	15. 0	12. 4	13. 4	11. 1
Indiana	31	33	1, 747, 927	1, 183, 567	15. 5	10. 4	10. 2	7. 5
Iowa	4	6	15, 300	13, 660	12. 2	8. 7	1. 1	1. 0
Kansas	1	1	49, 600	48, 800	10. 0	10. 0	5. 6	6. 5
Kentucky	129	132	16, 546, 059	16, 897, 580	40. 0	42. 0	22. 2	22. 6
Maryland	3	3	36, 800	41, 000	66. 7	80. 9	5. 5	12. 6
Missouri	9	9	175, 157	162, 629	7. 2	7. 0	5. 3	5. 5
Montana:								
Bituminous	8	8	29, 848	35, 700	8. 7	17. 7	3. 6	9. 2
Lignite	2	2	2, 500	1, 600	35. 5	27. 6	9. 7	6. 3
Total Montana	10	10	32, 348	37, 300	9. 2	18. 0	3. 8	9. 0
North Dakota (lignite)	16	17	500, 286	446, 675	19. 4	18. 7	17. 8	17. 4
Ohio	29	35	4, 158, 299	3, 322, 178	23. 7	21. 2	10. 7	9. 0
Oklahoma	6	5	112, 803	102, 594	15. 4	13. 7	5. 6	4. 7
Pennsylvania	140	115	8, 640, 162	7, 094, 512	30. 2	27. 9	9. 6	8. 3
Tennessee	4	4	113, 484	62, 790	9. 9	39. 9	1. 3	. 8
Utah	32	33	2, 116, 309	1, 293, 828	51. 6	31. 9	32. 4	18. 9
Virginia	28	40	3, 306, 717	3, 448, 206	28. 5	23. 9	11. 8	11. 7
West Virginia	168	188	20, 070, 131	21, 819, 429	27. 3	27. 9	12. 9	13. 9
Wyoming	18	16	289, 021	274, 260	11. 6	13. 3	11. 3	13. 0
Total	763	785	64, 731, 173	61, 825, 193	26. 6	25. 6	12. 9	12. 5

PRODUCTION BY STATES AND COUNTIES

Detailed production and employment statistics are given in table 49 for each coal-producing county in the United States from which three or more operators submitted reports for 1957. Statistics on counties with less than three reporting producers have been combined with data for "Other counties" to avoid disclosing individual figures, unless the operators have granted the Bureau permission to publish statistics separately. Production of mines on the border between two States has been credited to the State in which the coal was mined rather than to the State in which the tipple was located. If the coal was mined in both States, the tonnage was apportioned accordingly.

Bituminous coal and lignite were mined in 25 States and Alaska and 333 counties in 1957. As soft coal accounts for a large percentage of the economic activity in many counties, the key items pertaining to the industry are published by counties. These key items—(1) method of shipping the coal, (2) value, (3) number of men working daily, (4) days worked, and (5) tons per man per day—are useful in analyzing potential markets by counties.

The most striking fact brought out by the following table is the wide variation among several counties in the same State, not only in production, but even in average value and average tons per man per day. The differences in average value are due to quality of coal, method of transportation, or market conditions. The differences in output per man per day are caused largely by physical conditions, mining methods, and extent of mechanization.

TABLE 49.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States and counties

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
				ALABAMA					
Bibb	11, 232	63, 880	----------	75, 112	$4. 48	108	193	20, 807	3. 61
Blount	172, 553	57, 758	----------	230, 311	6. 32	95	170	16, 193	14. 22
Cullman	10, 300	20, 078	----------	30, 378	5. 48	48	70	3, 367	9. 02
Jackson	----------	18, 876	----------	18, 876	4. 88	19	201	3, 813	4. 95
Jefferson	9, 055, 887	236, 773	18, 102	9, 310, 762	6. 61	6, 251	210	1, 315, 231	7. 08
Marion	55, 962	161, 796	----------	217, 758	4. 62	266	158	42, 137	5. 17
St. Clair	----------	2, 000	----------	2, 000	4. 00	3	48	144	13. 89
Shelby	2, 450	76, 274	----------	78, 724	6. 52	152	189	28, 731	2. 74
Tuscaloosa	451, 274	42, 427	1, 250	494, 951	4. 57	192	174	33, 495	14. 78
Walker	894, 467	341, 694	1, 561, 069	2, 797, 230	6. 70	1, 408	198	278, 901	10. 03
Winston	----------	3, 400	----------	3, 400	5. 02	4	89	354	9. 60
Total Alabama	10, 654, 125	1, 024, 956	1, 580, 421	13, 259, 502	6. 49	8, 546	204	1, 743, 173	7. 61
				ALASKA					
Total Alaska	834, 715	3, 945	3, 678	842, 338	$8. 66	333	228	75, 780	11. 12

For footnotes, see end of table.

TABLE 49.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States and counties—Continued

County	Production (net tons)				Average value per ton[3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day[4]
	Shipped by rail or water[1]	Shipped by truck	Used at mine[2]	Total					
ARIZONA									
Navajo	----------	8,795	106	8,901	$7.02	33	107	3,531	2.52
ARKANSAS									
Franklin	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Johnson	194,586	1,000	14	195,600	$7.00	121	189	22,919	8.53
Logan	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Pope	1,390	----------	----------	1,390	6.56	1	203	124	11.18
Sebastian	250,933	8,166	11	259,110	8.59	490	133	65,301	3.97
Other counties	49,718	1,913	----------	51,631	7.19	93	91	8,496	6.08
Total Arkansas	496,627	11,079	25	507,731	7.83	705	137	96,840	5.24
COLORADO									
Delta	36,844	23,763	1,067	61,674	$5.45	51	169	8,628	7.15
El Paso	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Fremont	10,888	213,400	215	224,503	3.71	113	210	23,765	9.46
Garfield	----------	37,441	1,000	38,441	5.45	31	216	6,720	5.72
Gunnison	214,929	57,230	18,799	290,958	5.93	249	160	39,857	7.30
Huerfano	21,693	47,604	----------	69,297	6.46	63	185	11,588	5.98
Jackson	----------	1,448	----------	1,448	5.37	2	200	400	3.62
La Plata	21,362	17,357	18	38,737	4.10	33	183	6,062	6.39
Las Animas	1,291,782	22,918	3,424	1,318,124	7.78	1,535	205	314,588	4.19
Mesa	29,786	26,343	20,488	76,617	6.95	60	182	10,992	6.97
Moffat	93,625	14,399	----------	108,024	5.71	33	228	7,512	14.38
Montezuma	----------	1,035	----------	1,035	4.10	2	170	340	3.04
Montrose	----------	1,974	----------	1,974	5.95	3	210	630	3.13
Pitkin	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Rio Blanco	150	12,751	----------	12,901	5.97	9	158	1,424	9.06
Routt	426,246	35,875	2,944	465,065	4.11	212	161	34,086	13.64
Weld	374,487	236,657	9,958	621,102	4.70	314	183	57,403	10.82
Other counties	226,244	36,985	500	263,729	6.75	142	238	33,853	7.79
Total Colorado	2,748,036	787,180	58,413	3,593,629	6.08	2,852	196	557,848	6.44
GEORGIA									
Walker	----------	13,464	----------	13,464	$4.65	17	246	4,168	3.23
ILLINOIS									
Bureau	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Christian	5,501,118	220,592	16,628	5,738,338	$3.52	1,231	217	267,024	21.49
Clinton	19,806	73,837	2,931	96,574	4.58	238	120	28,572	3.38
Douglas	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Franklin	4,347,733	114,026	130,262	4,592,021	4.35	1,603	208	333,480	13.77
Fulton	5,253,924	218,611	11,519	5,484,054	4.02	852	249	212,475	25.81
Gallatin	151,517	43,440	332	195,289	3.17	111	136	15,101	12.93
Greene	----------	5,248	----------	5,248	4.05	2	300	600	8.75
Grundy	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Hancock	----------	34,284	238	34,522	6.59	14	160	2,234	15.45
Henry	64,528	16,709	177	81,414	4.64	45	225	10,202	7.98
Jackson	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Jefferson	2,937,281	75,798	3,402	3,016,481	4.42	692	242	167,610	18.00
Kankakee	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Knox	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)

For footnotes, see end of table.

TABLE 49.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
ILLINOIS—Continued									
La Salle	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Livingston	--------	1, 144	1, 078	2, 222	$8. 50	5	73	365	6. 09
Logan	--------	31, 400	259	31, 659	5. 00	11	201	2, 126	6. 30
Macoupin	341, 454	119, 593	9, 988	471, 035	4. 06	272	201	54, 708	8. 61
Madison	221, 887	646, 086	8, 613	876, 586	4. 05	573	151	86, 534	10. 13
Marion	11, 230	6, 000	1, 759	18, 989	4. 07	19	214	4, 164	4. 56
Menard	--------	14, 762	55	14, 817	6. 01	31	136	4, 197	3. 53
Montgomery	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Peoria	21, 456	326, 449	1, 318	349, 223	4. 92	129	180	23, 234	15. 03
Perry	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Randolph	614, 687	51, 357	100	666, 144	3. 40	154	175	26, 905	24. 76
St. Clair	2, 246, 647	1, 756, 595	6, 108	4, 009, 350	3. 62	777	218	169, 078	23. 71
Saline	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Sangamon	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Schuyler	--------	17, 617	--------	17, 617	5. 51	31	137	4, 249	4. 15
Vermilion	904, 985	165, 374	3, 182	1, 073, 541	4. 41	195	231	44, 976	23 87
Washington	10, 500	24, 456	750	35, 706	4. 10	48	146	7, 029	5. 08
Will	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Williamson	5, 738, 398	381, 829	9, 734	6, 129, 961	3. 96	1, 681	191	321, 478	19. 07
Other counties	12, 834, 540	1, 181, 888	35, 806	14, 052, 234	4. 07	3, 745	204	764, 862	18. 37
Total Illinois	41, 221, 691	5, 527, 095	244, 239	46, 993, 025	4. 00	12, 459	205	2, 551, 203	18. 42
INDIANA									
Clay	468, 559	240, 310	1, 988	710, 857	$4. 18	185	246	45, 451	15. 64
Daviess	--------	17, 400	--------	17, 400	3. 81	14	206	2, 881	6. 04
Dubois	--------	23, 796	--------	23, 796	3. 57	19	187	3, 546	6. 71
Fountain	--------	41, 802	--------	41, 802	6. 72	27	163	4, 414	9. 47
Gibson	411, 306	104, 318	12, 541	528, 165	4. 44	440	112	49, 426	10. 69
Greene	1, 536, 838	94, 172	1, 533	1, 632, 543	4. 16	307	204	62, 506	26. 12
Knox	1, 067, 404	210, 682	2, 335	1, 280, 421	4. 02	436	203	88, 638	14. 45
Martin	--------	63, 263	--------	63, 263	3. 81	24	240	5, 762	10. 98
Owen	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Parke	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Pike	2, 211, 068	101, 886	4, 017	2, 316, 971	3. 78	448	261	117, 003	19. 80
Spencer	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Sullivan	342, 271	165, 750	3, 322	511, 343	4. 32	203	190	38, 600	13. 25
Vermillion	58, 173	37, 451	1, 063	96, 687	4. 72	67	165	11, 024	8. 77
Vigo	2, 174, 947	206, 361	631, 384	3, 012, 692	4. 14	885	230	203, 172	14. 83
Warrick	5, 058, 261	358, 596	5, 552	5, 422, 409	3. 59	720	223	160, 335	33. 82
Other counties	131, 442	51, 168	329	182, 939	4. 30	86	175	15, 011	12. 19
Total Indiana	13, 460, 269	1, 716, 955	664, 064	15, 841, 288	3. 92	3, 861	209	807, 769	19. 61
IOWA									
Appanoose	25, 778	62, 316	593	88, 687	$5. 27	248	127	31, 449	2. 82
Davis	22, 880	12, 605	3	35, 488	3. 77	18	192	3, 459	10. 26
Lucas	--------	29, 776	--------	29, 776	3. 80	15	259	3, 890	7. 65
Mahaska	94, 921	75, 253	37	170, 211	3. 29	44	259	11, 382	14. 95
Marion	592, 603	175, 470	85	768, 158	3. 23	174	234	40, 735	18. 86
Monroe	53, 715	51, 114	--------	104, 829	3. 18	93	166	15, 445	6. 79
Polk	--------	13, 163	--------	13, 163	3. 40	2	260	520	25. 31
Van Buren	--------	21, 647	30	21, 677	5. 50	18	183	3, 299	6. 57
Wapello	--------	75, 546	--------	75, 546	3. 62	26	216	5, 620	13. 44
Warren	--------	4, 140	--------	4, 140	4. 48	6	233	1, 399	2. 96
Total Iowa	789, 897	521, 030	748	1, 311, 675	3. 46	644	182	117, 198	11. 19

For footnotes, see end of table.

TABLE 49.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States and countries—Continued

County	Production (net tons)				Average value per ton[3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day[4]
	Shipped by rail or water[1]	Shipped by truck	Used at mine[2]	Total					
KANSAS									
Bourbon	----------	4, 600	----------	4, 600	$3. 70	8	97	810	5. 68
Cherokee	453, 371	76, 303	----------	529, 674	4. 32	120	280	33, 694	15. 72
Coffey	----------	2, 025	----------	2, 025	4. 43	5	115	599	3. 38
Crawford	188, 781	19, 376	100	208, 257	4. 71	142	120	17, 027	12. 23
Osage	----------	4, 440	5	4, 445	7. 93	17	127	2, 153	2. 06
Total Kansas	642, 152	106, 744	105	749, 001	4. 45	292	186	54, 283	13. 80
KENTUCKY									
Eastern Kentucky:									
Bell	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Boyd	125, 940	113, 769	400	240, 109	$4. 31	98	265	25, 940	9. 26
Breathitt	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Carter	67, 945	74, 956	24	142, 925	4. 62	131	161	21, 080	6. 78
Clay	829, 959	376, 835	----------	1, 206, 794	3. 84	1, 182	146	172, 723	6. 99
Clinton	----------	17, 769	60	17, 829	2. 51	35	152	5, 386	3. 31
Elliott	----------	24, 928	----------	24, 928	3. 39	20	143	2, 868	8. 69
Floyd	5, 029, 747	180, 212	2, 189	5, 212, 148	5. 71	3, 533	186	657, 089	7. 93
Harlan	7, 704, 982	595, 956	30, 947	8, 331, 885	5. 97	5, 734	184	1, 055, 000	7. 90
Jackson	----------	185, 729	142	185, 871	4. 10	340	151	51, 209	3. 63
Johnson	390, 569	41, 431	----------	432, 000	3. 47	493	119	58, 616	7. 37
Knott	643, 080	708, 185	20	1, 351, 285	3. 84	964	140	134, 579	10. 04
Knox	283, 516	10, 100	50	293, 666	3. 67	342	120	40, 942	7. 17
Laurel	161, 851	57, 016	----------	218, 867	3. 59	145	167	24, 253	9. 02
Lawrence	----------	23, 540	----------	23, 540	5. 22	29	146	4, 181	5. 63
Lee	37, 800	85, 901	----------	123, 701	4. 81	134	230	30, 843	4. 01
Leslie	2, 529, 630	368, 739	2, 829	2, 901, 198	4. 44	2, 445	150	367, 557	7. 89
Letcher	5, 450, 260	705, 132	22, 160	6, 177, 552	5. 47	2, 886	190	548, 312	11. 27
McCreary	433, 411	46, 410	----------	479, 821	4. 01	252	239	60, 221	7. 97
Magoffin	11, 521	4, 151	----------	15, 672	3. 42	15	69	1, 037	15. 11
Martin	36, 498	----------	----------	36, 498	4. 30	54	156	8, 468	4. 31
Morgan	----------	132, 956	25	132, 981	4. 12	168	93	15, 687	. 48
Perry	5, 978, 589	56, 274	6, 349	6, 041, 212	4. 89	3, 298	191	629, 954	9. 59
Pike	8, 470, 039	723, 656	16, 789	9, 210, 484	5. 11	5, 901	183	1, 081, 827	8. 51
Pulaski	87, 850	86, 346	----------	174, 196	3. 85	141	165	23, 288	7. 48
Rockcastle	37, 114	53, 725	----------	90, 839	3. 84	69	164	11, 310	8. 03
Wayne	----------	37, 039	----------	37, 039	5. 20	38	217	8, 263	4. 48
Whitley	508, 388	120, 657	644	629, 689	4. 21	856	186	158, 879	3. 96
Wolfe	----------	8, 164	----------	8, 164	5. 02	17	133	2, 293	3. 56
Other counties	1, 691, 924	226, 591	2, 388	1, 920, 903	5. 00	1, 281	172	220, 869	8. 70
Total Eastern Kentucky	40, 510, 613	5, 066, 167	85, 016	45, 661, 796	5. 16	30, 601	177	5, 422, 674	8. 42
Western Kentucky:									
Butler	----------	120, 401	----------	120, 401	3. 90	85	189	16, 094	7. 48
Christian	----------	1, 200	----------	1, 200	3. 16	2	229	35	34. 19
Daviess	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Grayson	----------	1, 125	----------	1, 125	3. 16	1	229	33	34. 19
Hancock	----------	33, 533	----------	33, 533	3. 06	19	68	1, 261	26. 59
Henderson	----------	273, 383	429	273, 812	3. 13	157	214	33, 679	8. 13
Hopkins	12, 167, 471	530, 869	740	12, 699, 080	3. 68	3, 382	192	649, 297	19. 56
Muhlenberg	7, 031, 467	132, 483	12, 668	7, 176, 618	3. 39	2, 083	157	327, 432	21. 92
Ohio	2, 938, 679	88, 726	20	3, 027, 425	3. 59	354	216	76, 613	39. 52
Union	2, 864, 349	40, 180	3, 216	2, 907, 745	3. 85	937	209	195, 831	14, 85
Webster	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Other counties	2, 424, 298	339, 337	426	2, 764, 061	2. 91	422	217	91, 569	30. 19
Total Western Kentucky	27, 426, 264	1, 561, 237	17, 499	29, 005, 000	3. 54	7, 442	187	1, 391, 844	20. 84
Total Kentucky	67, 936, 877	6, 627, 404	102, 515	74, 666, 796	4. 53	38, 043	179	6, 814, 518	10. 96

For footnotes, see end of table.

TABLE 49.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States and counties—Continued

County	Production (net tons)				Average value per ton[3]	Average number of men working daily	Average number of days worked	Number man-days worked	Average tons per man per day[4]
	Shipped by rail or water[1]	Shipped by truck	Used at mine[2]	Total					
				MARYLAND					
Allegany	89, 691	140, 474	31	230, 196	$3. 92	239	170	40, 745	5. 65
Garrett	338, 277	179, 825	----------	518, 102	4. 21	462	151	69, 665	7. 44
Total Maryland	427, 968	320, 299	31	748, 298	4. 12	701	158	110, 410	6. 78
				MISSOURI					
Adair	----------	50, 001	750	50, 751	$4. 74	69	185	12, 752	3. 98
Barton	191, 699	39, 913	557	232, 169	4. 73	90	273	24, 568	9. 45
Bates	330, 878	4, 006	----------	334, 884	4. 07	113	148	16, 653	20. 11
Boone	----------	4, 302	25	4, 327	4. 28	6	84	503	8. 60
Callaway	----------	145, 430	----------	145, 430	4. 61	42	300	12, 580	11. 56
Clark	2, 000	4, 512	115	6, 627	5. 40	8	90	718	9. 23
Clay	----------	2, 243	----------	2, 243	8. 50	31	50	1, 526	1. 47
Dade	----------	14, 540	----------	14, 540	4. 99	9	285	2, 564	5. 67
Harrison	----------	3, 064	----------	3, 064	7. 00	10	145	1, 452	2. 11
Henry	1, 072, 874	48, 291	----------	1, 121, 165	4. 13	192	260	49, 807	22. 51
Lafayette	----------	9, 050	----------	9, 050	6. 76	43	153	6, 654	1. 36
Macon	579, 107	23, 757	----------	602, 864	4. 31	113	248	28, 079	21. 47
Putnam	72, 900	9, 970	----------	82, 870	4. 09	57	152	8, 636	9. 60
Ralls	----------	3, 630	----------	3, 630	6. 08	11	128	1, 412	2. 57
Randolph	----------	25, 807	----------	25, 807	5. 01	86	90	7, 727	3. 34
St. Clair	247, 172	3, 013	180	250, 365	4. 20	62	247	15, 211	16. 46
Vernon	68, 356	17, 580	----------	85, 936	3. 76	29	217	6, 296	13. 65
Total Missouri	2, 564, 986	409, 109	1, 627	2, 975, 722	4. 26	971	203	197, 138	15. 09
				MONTANA					
Bituminous coal:									
Blaine	----------	5, 128	100	5, 228	$7. 82	5	300	1, 498	3. 49
Carbon	4, 737	10, 218	97	15, 052	7. 52	8	160	3, 509	4. 29
Cascade	----------	2, 095	----------	2, 095	6. 34	3	131	347	6. 04
Hill	----------	1, 100	18	1, 118	10. 00	2	180	298	3. 75
Musselshell	160, 200	37, 525	----------	197, 725	5. 62	176	155	27, 272	7. 25
Rosebud	161, 303	1, 800	3, 008	166, 111	4. 65	43	171	7, 357	22. 58
Total bituminous coal	326, 240	57, 866	3, 223	387, 329	5. 33	237	170	40, 281	9. 62
Lignite:									
Custer	----------	5, 995	----------	5, 995	4. 17	6	115	690	8. 69
Dawson	----------	4, 062	----------	4, 062	3. 52	5	79	369	11. 01
Powder River	----------	1, 337	----------	1, 337	4. 00	2	65	129	10. 36
Richland	----------	3, 856	----------	3, 856	4. 44	8	57	474	8. 14
Sheridan	----------	10, 280	42	10, 322	3. 44	11	184	2, 023	5. 10
Total lignite	----------	25, 530	42	25, 572	3. 80	32	115	3, 685	6. 94
Total Montana	326, 240	83, 396	3, 265	412, 901	5. 23	269	163	43, 966	9. 39
				NEW MEXICO					
Colfax	26, 062	22, 306	28	48, 396	$6. 01	84	230	19, 358	2. 50
McKinley	14, 735	47, 415	250	62, 400	6. 16	61	226	13, 778	4. 53
Rio Arriba	13, 615	3, 171	----------	16, 786	5. 37	25	193	4, 810	3. 49
Sandoval	----------	2, 198	----------	2, 198	2. 82	3	82	274	8. 02
Santa Fe	3, 993	998	380	5, 371	7. 84	8	250	1, 997	2. 69
Socorro	----------	2, 000	----------	2, 000	7. 81	7	120	840	2. 38
Total New Mexico	58, 405	78, 088	658	137, 151	6. 05	188	218	41, 057	3. 34

For footnotes, see end of table.

TABLE 49.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
NORTH DAKOTA (LIGNITE)									
Adams	12,495	13,830	----------	26,325	$2.65	8	200	1,600	16.45
Bowman	182,058	12,090	1,069	195,217	1.77	18	221	4,064	48.03
Burke	351,197	30,796	59,691	441,684	2.27	53	230	12,138	36.39
Burleigh	----------	13,627	----------	13,627	3.28	3	96	288	47.32
Divide	215,234	27,778	----------	243,012	2.45	46	224	10,306	23.58
Dunn	----------	11,014	15	11,029	2.92	7	146	1,039	10.62
Grant	----------	21,338	----------	21,338	2.82	11	102	1,117	19.10
Hettinger	600	8,055	----------	8,655	2.93	7	116	814	10.63
McLean	60,306	54,433	200	114,939	2.90	22	188	4,152	27.68
Mercer	798,984	30,044	83,640	912,668	2.26	103	190	19,594	46.58
Morton	----------	28,396	----------	28,396	2.48	12	187	2,188	12.98
Oliver	----------	9,521	----------	9,521	2.50	4	73	289	33.00
Stark	----------	15,673	52,061	67,734	2.29	13	139	1,802	37.59
Ward	279,874	72,526	111,271	463,671	2.41	53	216	11,376	40.76
Williams	----------	2,836	----------	2,836	4.47	6	76	493	5.75
Total North Dakota	1,900,748	351,957	307,947	2,560,652	2.32	366	195	71,260	35.93
OHIO									
Athems	112,253	366,483	1,676	480,412	$4.48	325	173	56,164	8.55
Belmont	6,392,181	201,635	10,960	6,604,776	4.32	2,278	227	517,768	12.76
Carroll	64,343	357,471	3,543	425,357	3.56	166	198	32,899	12.93
Columbiana	35,748	1,471,225	13,662	1,520,635	3.48	387	252	97,396	15.61
Coshocton	394,889	721,507	----------	1,116,396	3.78	309	258	79,794	13.99
Gallia	752,631	66,034	----------	818,665	3.55	183	281	51,441	15.91
Guernsey	722,925	88,001	46	810,972	3.17	216	207	44,660	18.16
Harrison	9,001,503	353,488	22,366	9,377,357	4.49	2,247	235	527,865	17.76
Hocking	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Holmes	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Jackson	175,450	261,522	----------	436,972	4.08	150	198	29,663	14.73
Jefferson	2,734,637	1,056,354	5,193	3,796,184	4.05	1,144	216	247,510	15.34
Lawrence	25,000	220,090	----------	245,090	3.14	113	140	15,799	15.51
Mahoning	----------	708,747	151	708,898	4.07	140	293	40,929	17.32
Meigs	478,834	106,524	----------	585,358	3.26	260	150	38,950	15.03
Morgan	178,173	17,449	1,727,777	1,923,399	3.51	392	177	69,368	27.73
Muskingum	32,976	474,068	2,411	509,455	3.01	151	216	32,656	15.60
Noble	1,146,543	39,672	----------	1,186,215	2.28	95	261	24,780	47.87
Perry	1,614,525	640,054	50	2,254,629	3.56	529	236	124,810	18.06
Portage	----------	119,573	2,837	122,410	3.96	23	311	7,146	17.13
Stark	----------	839,047	1,228	840,275	3.47	322	226	72,688	11.56
Tuscarawas	278,367	2,172,936	14,069	2,465,372	3.82	790	250	197,527	12.48
Vinton	38,516	124,251	----------	162,767	4.38	134	205	27,512	5.92
Washington	----------	250,456	----------	250,456	2.93	35	240	8,318	30.11
Wayne	----------	109,259	----------	109,259	4.00	26	307	7,981	13.69
Other counties	2,788	107,510	----------	110,298	3.38	81	164	13,309	8.29
Total Ohio	24,182,282	10,873,356	1,805,969	36,861,607	3.96	10,496	226	2,366,933	15.57
OKLAHOMA									
Craig	40,549	68,643	----------	109,192	$3.48	42	225	9,545	11.44
Haskell	362,998	1,259	----------	364,257	6.58	88	247	21,744	16.75
Latimer	74,203	----------	----------	74,203	8.70	12	202	2,424	30.61
Le Flore	350,028	4,177	100	354,305	6.71	230	185	42,532	8.33
McIntosh	177,481	2,300	----------	179,781	3.17	36	310	11,314	15.89
Okmulgee	58,596	14,023	5	72,624	6.58	129	114	14,735	4.93
Pittsburg	252,901	----------	540	253,441	9.25	341	207	70,527	3.59
Rogers	411,679	22,107	----------	433,786	5.86	119	270	32,204	13.47
Sequoyah	353,670	----------	----------	353,670	6.88	43	357	15,431	22.92
Total Oklahoma	2,082,105	112,509	645	2,195,259	6.45	1,040	212	220,456	9.96

For footnotes, see end of table.

TABLE 49.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
PENNSYLVANIA									
Allegheny	5,541,937	1,189,996	302,510	7,034,443	$6.16	3,861	215	829,274	8.48
Armstrong	1,874,709	499,767	3,832	2,378,308	4.47	1,100	200	219,590	10.83
Beaver	----------	260,458	150	260,608	3.85	139	221	30,756	8.47
Bedford	300	166,323	----------	166,623	4.18	163	181	29,511	5.65
Blair	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Bradford	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Butler	832,135	1,165,609	1,520	1,999,264	3.90	629	237	149,270	13.39
Cambria	9,303,029	596,512	883,365	10,782,906	6.58	8,082	206	1,665,635	6.47
Cameron	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Centre	598,727	468,184	36	1,066,947	4.19	438	222	97,355	10.96
Clarion	2,013,341	844,489	4,359	2,862,189	4.03	804	254	204,415	14.00
Clearfield	6,141,572	622,053	6,223	6,769,848	4.43	2,933	213	625,051	10.83
Clinton	398,632	197,118	60	595,810	3.73	161	208	33,421	17.83
Elk	134,578	193,478	360	328,416	4.63	220	174	38,196	8.60
Fayette	4,808,976	565,554	428,482	5,803,012	6.53	3,582	211	755,709	7.68
Greene	12,200,331	35,118	36,481	12,271,930	6.54	6,590	220	1,448,659	8.47
Huntingdon	----------	52,105	21	52,126	4.14	56	174	9,744	5.35
Indiana	5,634,185	521,971	613,792	6,769,948	5.45	3,477	216	751,758	9.01
Jefferson	1,480,928	140,080	1,819	1,622,827	4.26	1,000	192	192,229	8.44
Lawrence	----------	1,026,949	----------	1,026,949	3.70	187	269	50,287	20.42
Lycoming	----------	85,608	----------	85,608	4.51	36	257	9,261	9.24
McKean	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Mercer	216,624	291,428	148	508,200	4.05	147	276	40,574	12.53
Somerset	3,420,959	447,577	41,072	3,909,608	5.35	2,905	185	536,078	7.29
Tioga	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Venango	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Washington	12,650,397	1,007,475	191,239	13,849,111	6.63	7,282	200	1,455,377	9.52
Westmoreland	2,158,261	781,538	1,044,226	3,984,025	5.52	2,152	185	397,217	10.03
Other counties	314,267	922,281	----------	1,236,548	4.24	318	239	75,981	16.27
Total Pennsylvania	69,723,888	12,081,671	3,559,695	85,365,254	5.77	46,262	208	9,645,348	8.85
SOUTH DAKOTA (LIGNITE)									
Dewey	----------	21,018	100	21,118	$3.75	10	246	2,397	8.81
TENNESSEE									
Anderson	754,947	724,275	1,803	1,481,025	$3.59	548	192	104,942	14.11
Bledsoe	23,858	3,279	----------	27,137	2.88	53	135	7,217	3.76
Campbell	704,909	270,708	291	975,908	4.10	2,305	77	177,509	5.50
Claiborne	387,125	64,590	60	451,775	3.77	385	151	58,261	7.75
Cumberland	26,137	88,887	----------	115,024	4.57	69	134	9,267	12.41
Fentress	81,170	41,693	----------	122,863	3.11	202	75	15,110	8.13
Grundy	180,650	1,115	810	182,575	3.70	95	110	10,417	17.53
Hamilton	130,425	28,618	----------	159,043	3.40	124	107	13,271	11.98
Marion	1,428,777	182,073	1,350	1,612,200	4.89	1,664	136	226,671	7.11
Morgan	136,782	546,493	928	684,203	3.96	620	203	125,642	5.45
Overton	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Putnam	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Rhea	4,811	49,294	----------	54,105	3.00	64	109	7,008	7.72
Scott	753,462	208,323	40	961,825	3.42	757	142	107,218	8.97
Sequatchie	242,214	31,169	8	273,391	2.79	332	127	42,190	6.48
Van Buren	38,589	19,829	----------	58,418	3.30	106	105	11,109	5.26
White	190,506	3,420	----------	193,926	2.72	252	34	8,665	22.38
Other counties	554,480	46,395	795	601,670	3.90	653	123	80,590	7.47
Total Tennessee	5,638,842	2,310,161	6,085	7,955,088	3.92	8,229	122	1,005,087	7.91

For footnotes, see end of table.

TABLE 49.—Production value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
UTAH									
Carbon	4, 953, 152	118, 287	269, 782	5, 341, 221	$6. 17	2, 331	221	515, 065	10. 37
Emery	1, 226, 473	173, 539	7, 816	1, 407, 828	4. 82	608	231	140, 362	10. 03
Garfield	----------	1, 213	----------	1, 213	4. 71	3	151	415	2. 92
Iron	----------	39, 612	----------	39, 612	4. 65	18	287	5, 165	7. 67
Kane	----------	1, 228	----------	1, 228	4. 71	1	120	120	10. 23
Sevier	48, 500	----------	----------	48, 500	5. 40	21	223	4, 778	10. 15
Summit	----------	18, 695	----------	18, 695	4. 44	8	223	1, 842	10. 15
Total Utah	6, 228, 125	352, 574	277, 598	6, 858, 297	5. 87	2, 990	223	667, 747	10. 27
VIRGINIA									
Buchanan	8, 402, 853	2, 067, 296	10, 852	10, 481, 001	$4. 79	6, 427	212	1, 362, 988	7. 69
Dickenson	4, 992, 166	186, 299	89, 271	5, 267, 736	5. 00	2, 414	232	559, 500	9. 42
Lee	495, 330	54, 803	----------	550, 133	6. 14	776	153	118, 586	4. 64
Montgomery	2, 767	22, 065	----------	24, 832	7. 67	71	190	13, 496	1. 84
Russell	2, 470, 605	160, 985	113, 470	2, 745, 060	5. 21	1, 128	227	255, 990	10. 72
Scott	5, 210	10, 974	----------	16, 184	3. 42	10	209	2, 005	8. 07
Tazewell	3, 834, 220	145, 880	13, 879	3, 993, 979	6. 60	2, 553	216	551, 497	7. 24
Wise	5, 827, 156	432, 523	166, 975	6, 426, 654	4. 85	3, 385	195	661, 714	9. 71
Total Virginia	26, 030, 307	3, 080, 825	394, 447	29, 505, 579	5. 22	16, 764	210	3, 525, 776	8. 37
WASHINGTON									
King	38, 326	40, 505	----------	78, 831	$8. 62	74	202	14, 958	5. 27
Kittitas	239, 595	13, 993	6, 993	260, 581	7. 62	258	204	52, 701	4. 94
Lewis	----------	3, 746	----------	3, 746	6. 12	5	98	489	7. 66
Thurston	----------	17, 178	----------	17, 178	4. 28	7	220	1, 539	11. 16
Total Washington	277, 921	75, 422	6, 993	360, 336	7. 66	344	203	69, 687	5. 17
WEST VIRGINIA									
Barbour	3, 756, 034	51, 619	1, 344	3, 808, 997	$4. 73	1, 395	190	264, 798	14. 38
Boone	7, 183, 041	153, 439	7, 530	7, 344, 010	5. 02	3, 188	219	699, 193	10. 50
Braxton	220, 872	----------	----------	220, 872	4. 14	148	206	30, 549	7. 23
Brooke	206, 447	132, 964	770, 703	1, 110, 114	4. 53	475	215	102, 163	10. 87
Clay	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Fayette	6, 938, 311	104, 122	76, 336	7, 118, 769	5. 98	4, 618	223	1, 028, 889	6. 92
Gilmer	392, 462	2, 428	----------	394, 890	3. 90	118	195	23, 056	17. 13
Grant	40, 623	53, 331	----------	93, 954	3. 84	86	218	18, 774	5. 00
Greenbrier	1, 224, 725	114, 314	1, 226	1, 340, 265	5. 41	835	213	177, 471	7. 55
Hancock	----------	8, 071	----------	8, 071	5. 06	14	213	2, 982	2. 71
Harrison	9, 043, 354	118, 327	31, 458	9, 193, 139	4. 65	3, 218	196	631, 783	14. 55
Kanawha	10, 419, 701	317, 552	130, 623	10, 867, 876	5. 03	4, 138	223	923, 291	11. 77
Lewis	1, 048, 729	10, 781	----------	1, 059, 510	3. 74	227	234	53, 214	19. 91
Logan	22, 457, 696	35, 520	25, 072	22, 518, 288	5. 31	9, 840	233	2, 291, 262	9. 83
Marion	11, 847, 922	114, 698	8, 287	11, 970, 907	5. 68	4, 302	222	954, 361	12. 54
Marshall	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Mason	163, 144	31, 882	5	195, 031	4. 13	105	229	24, 048	8. 11
McDowell	18, 406, 361	266, 891	350, 183	19, 023, 435	7. 00	9, 458	220	2, 082, 886	9. 13
Mercer	1, 417, 401	18, 510	6, 416	1, 442, 327	6. 55	851	197	168, 011	8. 58
Mineral	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Mingo	7, 644, 558	6, 613	16, 458	7, 667, 629	5. 26	3, 016	205	618, 082	12. 41
Monongalia	10, 058, 042	101, 699	1, 066	10, 160, 807	5. 11	3, 257	213	693, 766	14. 65

TABLE 49.—Production, value, men working daily, days active, man-days, and output per man per day at bituminous-coal and lignite mines in the United States, 1957, by States and counties—Continued

County	Production (net tons)				Average value per ton [3]	Average number of men working daily	Average number of days worked	Number of man-days worked	Average tons per man per day [4]
	Shipped by rail or water [1]	Shipped by truck	Used at mine [2]	Total					
WEST VIRGINIA—Continued									
Nicholas	5,686,834	159,427	47,067	5,893,328	$5.57	3,332	216	720,303	8.18
Ohio	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)
Pocahontas	555,816	8,982	----------	564,798	4.04	371	214	79,524	7.10
Preston	1,438,183	927,816	84,811	2,450,810	3.76	1,499	206	308,789	7.94
Putnam	92,919	65,550	188	158,657	4.22	59	184	10,836	14.64
Raleigh	11,297,434	228,383	40,959	11,566,776	6.55	6,672	225	1,499,622	7.71
Randolph	982,699	25,994	9,244	1,017,937	5.82	735	225	165,012	6.17
Taylor	507,215	6,904	----------	514,119	3.79	198	181	35,896	14.32
Tucker	355,663	----------	----------	355,663	4.00	98	211	20,668	17.21
Upshur	1,374,989	54,647	----------	1,429,636	4.63	580	219	126,919	11.26
Wayne	153,674	18,338	34	172,046	4.14	132	218	28,674	6.00
Webster	1,100,583	24,996	490	1,126,069	5.58	647	199	128,936	8.73
Wyoming	12,699,879	158,658	33,897	12,892,434	6.16	5,980	230	1,377,637	9.36
Other countries	2,775,061	373,677	12,136	3,160,874	4.81	1,609	191	307,935	10.26
Total West Virginia	151,490,372	3,696,133	1,655,533	156,842,038	5.58	71,201	219	15,599,330	10.05
WYOMING									
Campbell	296,630	68,493	736	365,859	$1.27	26	303	7,861	46.54
Carbon	107,895	9,651	2,198	119,744	3.17	41	226	9,277	12.91
Converse	----------	6,225	25	6,250	3.35	2	300	600	10.42
Fremont	----------	1,220	----------	1,220	5.67	5	83	390	3.13
Hot Springs	6,862	9,577	----------	16,439	6.23	19	126	2,389	6.88
Lincoln	644,751	----------	2,533	647,284	2.86	153	166	25,443	25.44
Sheridan	368,469	36,709	3,570	408,748	3.40	96	227	21,747	18.80
Sweetwater	500,843	6,767	44,112	551,722	6.46	677	89	60,232	9.16
Total Wyoming	1,925,450	138,642	53,174	2,117,266	3.67	1,019	126	127,939	16.55
UNITED STATES									
Total United States	431,642,028	50,333,807	10,728,081	492,703,916	$5.08	228,635	203	46,520,842	10.59

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[1] Includes coal loaded at mines directly into railroad cars or river barges, hauled by trucks to railroad sidings, and hauled by trucks to waterways.

[2] Includes coal transported from mines to point of use by conveyor belts or trams, used by mine employees, taken by locomotive tenders at tipples, used at mines for power and heat, made into beehive coke at mines, and all other uses at mines.

[3] Value received or charged for coal f. o. b. mines. Includes a value for coal not sold but used by producers, such as mine fuel and coal coked, as estimated by producers at average prices that might have been received if such coal had been sold commercially.

[4] In certain counties the average tons per man per day is large due to auger mining, strip mining, or mechanical loading underground.

[5] Included in "Other counties" to avoid disclosing individual operations.

TRANSPORTATION

Within recent years methods of shipping bituminous coal and lignite from the mines have changed radically; shipments by rail have declined, whereas shipments by water and truck have increased. Generally, the cost by water or truck (particularly for short distances) is less than rail freight rate.

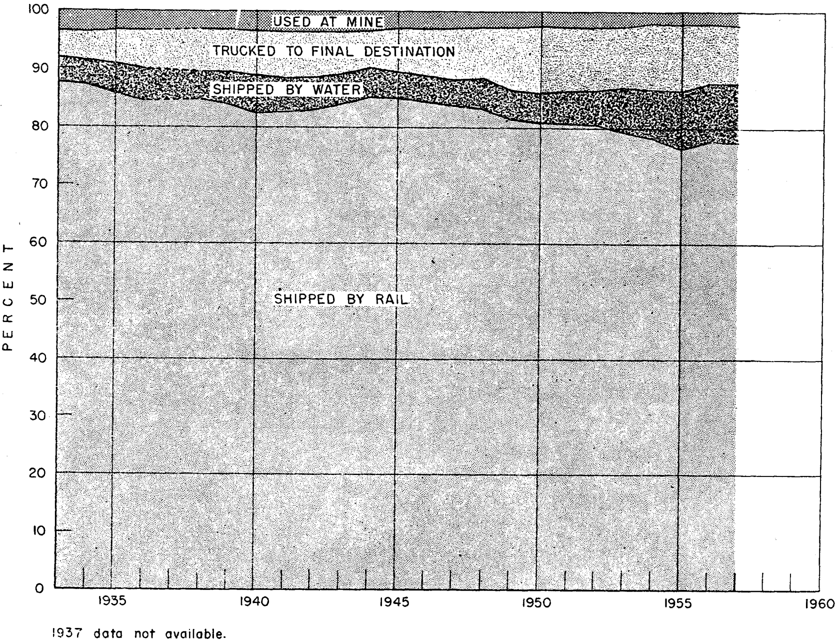

FIGURE 13.—Percentage of total production of bituminous coal and lignite, 1933–57, by methods of shipment from mines and used at mines.

TABLE 50.—Method of shipment of bituminous coal and lignite from mines, and used at mines, in the United States, 1933–57

Year	Method of shipment from mines			Used at mines [1]	Total production
	Shipped by rail and trucked to rail	Shipped by water and trucked to water	Trucked to final destination		
	THOUSAND NET TONS				
1933	293,258	13,021	15,463	11,888	333,630
1934	313,304	15,128	18,739	12,197	359,368
1935	319,742	18,327	21,960	12,344	372,373
1936	370,763	24,868	27,929	15,528	439,088
1937	(2)	(2)	(2)	(2)	445,531
1938	295,336	16,903	25,592	10,714	348,545
1939	331,190	22,229	29,534	11,902	394,855
1940	380,388	29,493	35,540	15,350	460,771
1941	425,184	30,240	40,056	18,669	514,149
1942	482,814	34,018	45,154	20,707	582,693
1943	495,863	30,188	42,433	21,693	590,177
1944	527,136	31,518	40,123	20,799	619,576
1945	490,472	27,548	41,477	18,120	577,617
1946	450,615	24,642	42,731	15,934	533,922
1947	527,282	29,803	55,859	17,680	630,624
1948	498,194	26,735	58,260	16,329	599,518
1949	356,602	21,829	47,786	11,651	437,868
1950	417,225	27,583	58,286	13,217	516,311
1951	430,387	29,984	58,132	15,162	533,665
1952	375,911	27,746	50,231	12,953	466,841
1953	362,133	35,648	47,102	12,407	457,290
1954	305,918	32,912	44,689	8,187	391,706
1955	355,924	47,476	51,607	9,626	464,633
1956	390,015	50,732	49,768	10,359	500,874
1957	381,562	50,080	50,334	10,728	492,704
	PERCENTAGE OF TOTAL				
1933	87.9	3.9	4.6	3.6	100.0
1934	87.2	4.2	5.2	3.4	100.0
1935	85.9	4.9	5.9	3.3	100.0
1936	84.4	5.7	6.4	3.5	100.0
1937	(2)	(2)	(2)	(2)	100.0
1938	84.7	4.9	7.3	3.1	100.0
1939	83.9	5.6	7.5	3.0	100.0
1940	82.6	6.4	7.7	3.3	100.0
1941	82.7	5.9	7.8	3.6	100.0
1942	82.9	5.8	7.7	3.6	100.0
1943	84.0	5.1	7.2	3.7	100.0
1944	85.1	5.1	6.5	3.3	100.0
1945	84.9	4.8	7.2	3.1	100.0
1946	84.4	4.6	8.0	3.0	100.0
1947	83.6	4.7	8.9	2.8	100.0
1948	83.1	4.5	9.7	2.7	100.0
1949	81.4	5.0	10.9	2.7	100.0
1950	80.8	5.3	11.3	2.6	100.0
1951	80.7	5.6	10.9	2.8	100.0
1952	80.5	5.9	10.8	2.8	100.0
1953	79.2	7.8	10.3	2.7	100.0
1954	78.1	8.4	11.4	2.1	100.0
1955	76.6	10.2	11.1	2.1	100.0
1956	77.9	10.1	9.9	2.1	100.0
1957	77.4	10.2	10.2	2.2	100.0

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[1] Includes coal used by mine employees, taken by locomotive tenders at tipples, used at mines for power and heat, transported from mines to point of use by conveyors or trams, made into beehive coke at mines, and all other uses at mines.

[2] Data not available.

TABLE 51.—Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, 1957, as reported by mine operators

Route	State	Net tons: By State	Net tons: Total for route
RAILROAD			
Alabama Central	Alabama	125, 504	125, 504
Alaska	Alaska	834, 715	834, 715
Atchison, Topeka & Santa Fe	Colorado	10, 888	359, 860
	Illinois	304, 182	
	New Mexico	44, 790	
Baltimore & Ohio	Illinois	239, 143	41, 808, 268
	Indiana	8, 680	
	Maryland	229, 985	
	Ohio	3, 602, 138	
	Pennsylvania	6, 926, 005	
	West Virginia	30, 802, 317	
Bessemer & Lake Erie	Pennsylvania	1, 149, 734	1, 149, 734
Cambria & Indiana	Pennsylvania	2, 783, 447	2, 783, 447
Campbell's Creek	West Virginia	582, 324	582, 324
Carbon County	Utah	1, 692, 521	1, 692, 521
Central of Georgia	Alabama	31, 786	31, 786
Chesapeake & Ohio	Kentucky	11, 745, 217	59, 556, 984
	Ohio	98, 019	
	Virginia	65, 826	
	West Virginia	47, 647, 922	
Cheswick & Harmar	Pennsylvania	603, 136	603, 136
Chicago, Burlington & Quincy	Illinois	7, 456, 686	8, 758, 761
	Iowa	199, 834	
	Missouri	430, 280	
	Wyoming	671, 961	
Chicago & Eastern Illinois	Illinois	2, 606, 666	2, 912, 109
	Indiana	305, 443	
Chicago & Illinois Midland	Illinois	3, 535, 368	3, 535, 368
Chicago, Milwaukee, St. Paul & Pacific	Indiana	2, 133, 549	2, 488, 902
	Montana (bituminous)	160, 200	
	North Dakota (lignite)	195, 153	
Chicago & North Western	Illinois	583, 047	583, 047
Chicago, Rock Island & Pacific	Illinois	945, 933	1, 418, 680
	Iowa	132, 600	
	Missouri	265, 944	
	Oklahoma	74, 203	
Clinchfield	Kentucky	131, 251	6, 038, 104
	Virginia	5, 906, 853	
Colorado & Southern	Colorado	8, 455	8, 455
Colorado & Wyoming	Colorado	1, 283, 327	1, 283, 327
Conemaugh & Black Lick	Pennsylvania	473, 902	473, 902
Denver & Rio Grande Western	Colorado	1, 070, 879	4, 434, 739
	New Mexico	13, 615	
	Utah	3, 350, 245	
Erie	Ohio	28, 492	348, 699
	Pennsylvania	320, 207	
Fort Smith & Van Buren	Oklahoma	170, 870	170, 870
Great Northern	North Dakota (lignite)	566. 431	566, 431
Gulf, Mobile & Ohio	Alabama	195, 528	880, 223
	Illinois	684, 695	
Illinois Central	Illinois	11, 491, 849	26, 584, 426
	Indiana	19, 868	
	Kentucky	15, 072, 709	
Illinois Terminal	Illinois	1, 134, 899	1, 134, 899
Interstate	Kentucky	145, 562	4, 515, 960
	Virginia	4, 370, 398	
Johnstown & Stony Creek	Pennsylvania	238, 881	238, 881
Kansas City Southern	Missouri	330, 878	854, 097
	Oklahoma	523, 219	
Kentucky & Tennessee	Kentucky	422, 161	422, 161
Lake Erie, Franklin & Clarion	Pennsylvania	665, 798	665, 798
Litchfield & Madison	Illinois	150, 936	150, 936

See footnote at end of table.

TABLE 51.—Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, 1957, as reported by mine operators—Con.

Route	State	Net tons	
		By State	Total for route
RAILROAD—continued			
Louisville & Nashville	Alabama	2, 677, 289	32, 800, 852
	Illinois	3, 500	
	Kentucky	28, 220, 708	
	Tennessee	1, 758, 245	
	Virginia	141, 110	
Mary Lee	Alabama	549, 913	549, 913
Midland Valley	Arkansas	130, 472	493, 470
	Oklahoma	362, 998	
Minneapolis & St. Louis	Illinois	1, 174, 316	1, 174, 316
Minneapolis, St. Paul & Sault Ste. Marie	North Dakota (lignite)	340, 180	340, 180
Missouri-Illinois	Illinois	575, 299	575, 299
Missouri-Kansas-Texas	Kansas	432, 756	1, 481, 116
	Missouri	617, 978	
	Oklahoma	430, 382	
Missouri Pacific	Arkansas	245, 694	4, 113, 572
	Illinois	3, 742, 807	
	Kansas	56, 715	
	Missouri	68, 356	
Monon	Indiana	313, 061	313, 061
Monongahela	Pennsylvania	1, 210, 756	8, 162, 366
	West Virginia	6, 951, 610	
Montour	Pennsylvania	1, 892, 953	1, 892, 953
New York Central (includes coal shipped over Kanawha & Michigan, Kelley's Creek, Toledo & Ohio Central, and Zanesville & Western).	Illinois	4, 219, 608	20, 320, 464
	Indiana	5, 115, 656	
	Ohio	3, 028, 587	
	Pennsylvania	4, 769, 763	
	West Virginia	3, 186, 850	
New York, Chicago & St. Louis	Ohio	7, 798, 464	7, 798, 464
Norfolk & Western	Kentucky	4, 782, 052	47, 469, 062
	Virginia	14, 855, 545	
	West Virginia	27, 831, 465	
Northern Pacific	Montana (bituminous)	166, 040	1, 204, 619
	North Dakota (lignite)	798, 984	
	Washington	239, 595	
Pacific Coast	Washington	38, 326	38. 326
Pennsylvania (includes Pittsburgh, Cincinnati, Chicago, & St. Louis).	Illinois	4, 587	29, 633, 445
	Indiana	3, 113, 511	
	Ohio	5, 027, 490	
	Pennsylvania	21, 482, 097	
	West Virginia	5, 760	
Pittsburgh & Lake Erie	Pennsylvania	759, 202	759, 202
Pittsburg & Shawmut	Pennsylvania	1, 237, 239	1, 237, 239
Pittsburgh & West Virginia	Ohio	1, 057, 177	1, 134, 293
	Pennsylvania	77, 116	
St. Louis & Belleville Electric Ry. Co	Illinois	552, 365	552, 365
St. Louis-San Francisco	Alabama	880, 444	2, 374, 742
	Arkansas	120, 461	
	Kansas	152, 681	
	Missouri	700, 723	
	Oklahoma	520, 433	
Southern	Alabama	294, 290	3, 282, 543
	Indiana	315, 464	
	Kentucky	357, 797	
	Tennessee	1, 624, 417	
	Virginia	690, 575	
Southern Iowa	Iowa	20, 527	20, 527
Tennessee	Tennessee	992, 057	992, 057
Tennessee Central	Tennessee	847, 083	847, 083
Tennessee Coal, Iron & Railroad Co	Alabama	3, 698, 453	3, 698, 453
Thomas & Sayreton	Alabama	267, 960	267, 960
Toledo, Peoria, & Western	Illinois	312, 156	312, 156
Union Pacific	Colorado	374, 487	1, 627, 976
	Wyoming	1, 253, 489	
Unity	Pennsylvania	766, 494	766, 494
Utah	Utah	1, 185, 359	1, 185, 359
Virginian	West Virginia	17, 773, 732	17, 773, 732
Wabash	Iowa	436, 936	587, 763
	Missouri	150, 827	
Western Allegheny	Pennsylvania	290, 467	290, 467
Western Maryland	Maryland	197, 983	5, 567, 713
	Pennsylvania	337, 403	
	West Virginia	5, 032, 327	
Woodward Iron Company	Alabama	834, 717	834, 717
Total railroad shipments		380, 471, 373	380, 471, 373

See footnote at end of table.

TABLE 51.—**Bituminous coal and lignite loaded for shipment by railroads and waterways in the United States, 1957, as reported by mine operators—Con.**

Route	State	Net tons	
		By State	Total for route
WATERWAY			
Allegheny River	Pennsylvania	1,860,664	1,860,664
Black Warrior River	Alabama	564,932	564,932
Green River	Kentucky	2,849,650	2,849,650
Illinois River	Illinois	1,207,629	1,207,629
Inland Water Way	Alabama	533,309	533,309
Kanawha River	West Virginia	4,575,211	4,575,211
Kentucky River	Kentucky	68,198	68,198
Monongahela River	Pennsylvania	21,878,624	28,065,192
	West Virginia	6,186,568	
Ohio River	Illinois	296,020	10,993,485
	Indiana	2,135,037	
	Kentucky	4,106,227	
	Ohio	3,541,915	
	West Virginia	914,286	
Tennessee River	Tennessee	417,040	417,040
Tradewater River	Kentucky	35,345	35,345
Total waterway shipments		51,170,655	51,170,655
Total loaded at mines for shipment by railroads and waterways.		431,642,028	431,642,028
Shipped by truck from mine to final destination.		50,333,807	50,333,807
Used at mine [1]		10,728,081	10,728,081
Total production, 1957		492,703,916	492,703,916

[1] Includes coal used by mine employees, taken by locomotive tenders at tipples, used at mines for power and heat, transported from mines to point of use by conveyors or trams, made into beehive coke at mines, and all other uses at mines.

CONSUMPTION

The statistics on consumption of bituminous coal and lignite, by major consumer classes, are based upon complete coverage of all consumers in each class, except "Other manufacturing and mining industries" and "Retail deliveries to other consumers." The figures for each of these 2 categories are based upon a monthly sample approximating 35-percent coverage. A new benchmark representing complete coverage for "Other manufacturing and mining industries" was established for 1954, based upon data from the Census of Manufactures and the Census of Mineral Industries. The new benchmark for "Retail deliveries to other consumers" for 1954 represents the residual tonnage not otherwise accounted for and includes some coal shipped by truck from mine to final destination. Current data for each month are determined by matching identical plants reporting for the preceding 2 months, calculating the percentage of change from the previous month, and applying this percentage change to the published figure for the previous month. The results obtained have been reasonably reliable over a period of years. A detailed analysis of the establishment of the new benchmarks and the revisions in "Cement mills," "Steel and rolling mills," and "Bunker, foreign and lake vessels," is given in Bureau of Mines Weekly Coal Report 2113, March 14, 1958. The above described revisions apply to the figures in table 52 for 1933–57. The total of classes shown approximates total consumption and is a much more reliable figure than "calculated" consumption based on production, imports, exports, and changes in stocks, because certain significant items of stocks are not included in year-end stocks.

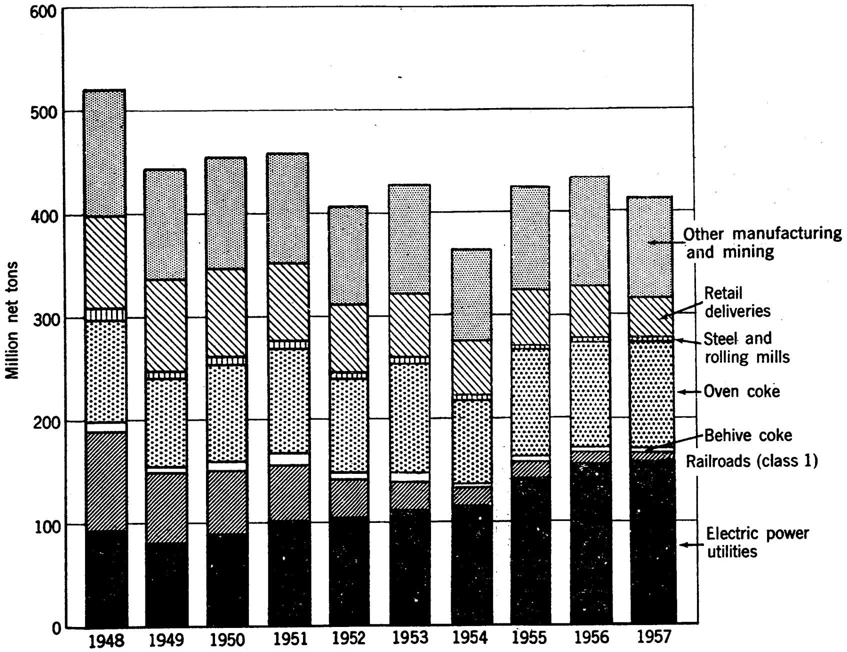

FIGURE 14.—Consumption of bituminous coal and lignite, by consumer class, and retail deliveries in the United States, 1948–57.

TABLE 52.—Consumption of bituminous coal and lignite, by consumer class, with retail deliveries in the United States, 1933–57, in thousand net tons

Year and month	Electric power utilities [1]	Bunker, foreign and lake vessel [2]	Railroads (class I) [3]	Manufacturing and mining industries					Retail deliveries to other consumers [6]	Total of classes shown [7]
				Beehive coke plants	Oven coke plants	Steel and rolling mills [4]	Cement mills	Other manufacturing and mining industries [5]		
1933	27, 088	2, 298	72, 548	1, 408	38, 681	14, 129	2, 760	81, 377	77, 396	317, 685
1934	29, 707	2, 423	76, 037	1, 635	44, 343	15, 391	3, 457	87, 314	83, 507	343, 814
1935	30, 936	2, 683	77, 109	1, 469	49, 046	16, 585	3, 456	94, 598	80, 444	356, 326
1936	38, 104	3, 052	86, 391	2, 698	63, 244	19, 019	4, 711	111, 030	80, 044	408, 293
1937	41, 045	3, 433	88, 080	4, 927	69, 575	18, 148	5, 182	124, 056	76, 331	430, 777
1938	36, 440	2, 310	73, 921	1, 360	45, 266	11, 877	4, 413	94, 196	66, 498	336, 281
1939	42, 304	2, 764	79, 072	2, 298	61, 216	13, 843	5, 194	100, 637	68, 770	376, 098
1940	49, 126	2, 989	85, 130	4, 803	76, 583	14, 169	5, 559	107, 864	84, 687	430, 910
1941	59, 888	3, 304	97, 384	10, 529	82, 609	15, 384	6, 735	121, 880	94, 402	492, 115
1942	63, 472	3, 226	115, 410	12, 876	87, 974	14, 722	7, 462	132, 767	102, 141	540, 050
1943	74, 036	3, 042	130, 283	12, 441	90, 019	15, 864	5, 842	142, 149	120, 121	593, 797
1944	76, 656	3, 069	132, 049	10, 858	94, 438	15, 152	3, 767	131, 498	122, 112	589, 599
1945	71, 603	3, 192	125, 120	8, 135	87, 214	14, 241	4, 203	126, 562	119, 297	559, 567
1946	68, 743	2, 632	110, 166	7, 167	76, 121	12, 151	6, 990	117, 732	98, 684	500, 386
1947	86, 009	3, 087	109, 296	10, 475	94, 325	14, 195	7, 919	123, 928	96, 657	545, 891
1948	95, 620	2, 552	94, 838	10, 322	96, 984	14, 193	8, 546	110, 060	86, 794	519, 909
1949	80, 610	2, 056	68, 123	5, 354	85, 882	10, 529	7, 966	96, 629	88, 389	445, 538
1950	88, 262	2, 042	60, 969	9, 088	94, 757	10, 877	7, 923	95, 862	84, 422	454, 202
1951	101, 898	2, 220	54, 005	11, 418	102, 030	11, 260	8, 507	103, 188	74, 378	468, 904
1952	103, 309	1, 839	37, 962	6, 912	90, 702	9, 632	7, 903	93, 637	66, 861	418, 757
1953	112, 283	1, 839	27, 735	8, 226	104, 648	8, 764	8, 167	95, 160	59, 976	426, 798
1954	115, 235	1, 244	17, 370	980	84, 411	6, 983	7, 924	77, 115	51, 798	363, 060
1955	140, 550	1, 499	15, 473	2, 869	104, 508	7, 353	8, 529	89, 611	53, 020	423, 412
1956:										
January	14, 941	5	1, 362	424	9, 450	796	832	9, 774	7, 909	45, 493
February	13, 147	6	1, 197	414	8, 821	732	738	9, 129	7, 021	41, 205
March	13, 081	15	1, 206	457	9, 424	750	772	9, 394	6, 022	41, 121
April	11, 674	137	1, 093	415	9, 066	654	717	8, 173	4, 124	36, 053
May	11, 786	206	1, 028	433	9, 168	562	748	7, 674	2, 882	34, 487
June	12, 065	193	865	359	8, 485	528	729	6, 738	1, 910	31, 872
July	11, 747	142	709	102	3, 130	200	743	5, 855	1, 978	24, 606
August	12, 909	165	868	186	7, 783	469	744	6, 487	2, 747	32, 358
September	12, 169	185	916	246	8, 915	504	697	6, 481	3, 109	33, 222
October	13, 238	193	1, 008	301	9, 266	615	731	7, 505	3, 422	36, 279
November	13, 757	165	1, 019	339	8, 979	643	763	7, 873	3, 580	37, 118
December	14, 469	58	1, 037	367	9, 383	736	812	8, 219	3, 963	39, 044
Total	154, 983	1, 470	12, 308	4, 043	101, 870	7, 189	9, 026	93, 302	48, 667	432, 858
1957:										
January	15, 669	6	978	437	9, 366	835	787	8, 967	5, 778	42, 823
February	12, 937	7	802	420	8, 464	677	699	7, 756	4, 233	35, 995
March	13, 565	17	865	448	9, 391	669	752	7, 989	3, 598	37, 294
April	12, 237	120	729	364	8, 805	585	715	7, 246	2, 573	33, 374
May	12, 322	185	685	305	9, 119	544	701	6, 753	1, 580	32, 194
June	12, 210	191	614	262	8, 775	437	629	6, 233	1, 417	30, 768
July	12, 443	183	621	242	9, 027	433	442	5, 996	1, 430	30, 817
August	13, 034	185	671	263	9, 037	436	782	6, 446	2, 042	32, 896
September	12, 469	170	619	235	8, 746	452	734	6, 414	2, 469	32, 308
October	13, 521	165	626	205	8, 723	569	789	7, 594	3, 510	35, 702
November	13, 345	113	607	153	7, 865	621	786	7, 685	3, 159	34, 334
December	13, 646	22	584	139	7, 229	680	817	8, 123	3, 923	35, 163
Total	157, 398	1, 364	8, 401	3, 473	104, 547	6, 938	8, 633	87, 202	35, 712	413, 668

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[1] Federal Power Commission.

[2] Bureau of the Census, U. S. Department of Commerce. Ore and Coal Exchange.

[3] Association of American Railroads. Represents consumption of bituminous coal and lignite for all uses, including locomotive, powerhouse, shop, and station fuel.

[4] Estimates based upon reports collected from a selected list of representative steel and rolling mills.

[5] Estimates based upon reports collected from a selected list of representative manufacturing plants.

[6] Estimates based upon reports collected from a selected list of representative retailers. Includes some coal shipped by truck from mine to final destination.

[7] The total of classes shown approximates total consumption. The calculation of consumption from production, imports, exports, and changes in stocks is not as accurate as the "Total of classes shown" because certain significant items of stocks are not included in year-end stocks. These items are: Stocks on Lake and Tidewater docks, stocks at other intermediate storage piles between mine and consumer, and coal in transit.

TABLE 53.—Fuel economy in consumption of coal at electric-utility powerplants in the United States, 1919–57

Year	Coal consumed per kilowatt-hour (pounds)	Index numbers, based on 1919 as 100	Year	Coal consumed per kilowatt-hour (pounds)	Index numbers, based on 1919 as 100	Year	Coal consumed per kilowatt-hour (pounds)	Index numbers, based on 1919 as 100
1919	3.20	100.0	1932	1.49	46.6	1945	1.30	40.6
1920	3.00	93.8	1933	1.46	45.6	1946	1.29	40.3
1921	2.70	84.4	1934	1.45	45.3	1947	1.31	40.9
1922	2.50	78.1	1935	1.44	45.0	1948	1.30	40.6
1923	2.40	75.0	1936	1.44	45.0	1949	1.24	38.8
1924	2.20	68.8	1937	1.44	45.0	1950	1.19	37.2
1925	2.00	62.5	1938	1.40	43.8	1951	1.14	35.6
1926	1.90	59.4	1939	1.38	43.1	1952	1.10	34.4
1927	1.82	56.9	1940	1.34	41.9	1953	1.06	33.1
1928	1.73	54.1	1941	1.34	41.9	1954	.99	30.9
1929	1.66	51.9	1942	1.30	40.6	1955	.95	29.7
1930	1.60	50.0	1943	1.30	40.6	1956	.94	29.4
1931	1.52	47.5	1944	1.29	40.3	1957	.93	29.1

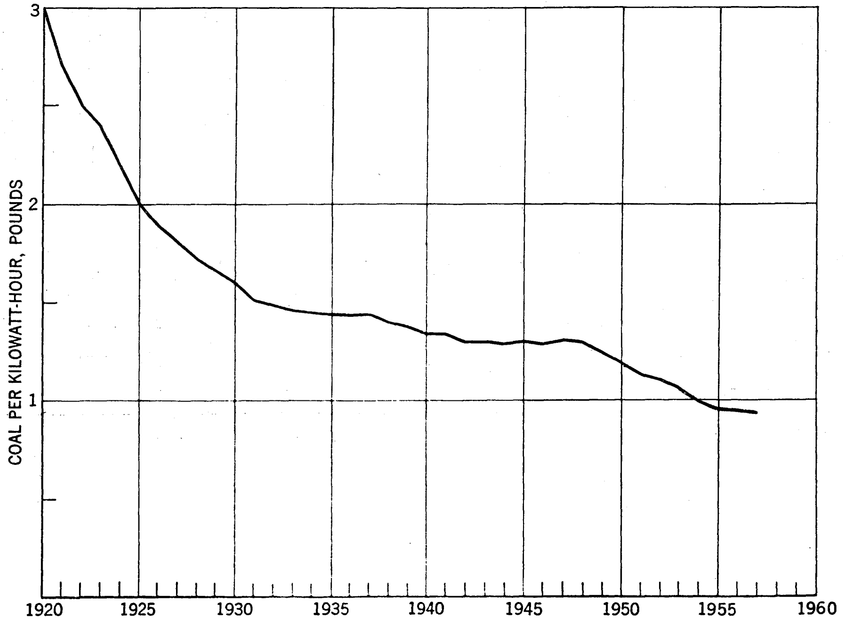

FIGURE 15.—Trend in fuel economy at electric–utility powerplants in the United States, 1920–57.

RELATIVE RATE OF GROWTH OF MINERAL FUELS AND WATERPOWER

Information on the trends in consumption of the various energy fuels and waterpower is given in the Review of Mineral-Fuel Industries, Minerals Yearbook, volume II, 1957.

STOCKS

The figures on stocks are based on complete coverage for all categories except "Other manufacturing and mining industries" and "Retail-dealer stocks." Stocks for these two categories are based on samples, and the statistical procedure followed is that for calculating total consumption.

TABLE 54.—Stocks of bituminous coal and lignite in hands of commercial consumers and in retail dealers' yards in the United States, 1956–57

Date	Total stocks (net tons)	Days' supply at current rate of consumption on date of stock taking							
		Coke ovens	Steel plants	Other industrials	Electric utilities	Retail yards	Railroads	Cement mills	Total
1956									
Jan. 31	65,797,000	41	32	40	76	4	24	41	45
Feb. 29	65,261,000	41	31	41	80	4	24	40	46
Mar. 31	65,847,000	42	31	43	87	3	24	39	50
Apr. 30	67,237,000	43	35	48	97	5	25	41	56
May 31	71,796,000	46	44	57	106	9	27	44	65
June 30	73,678,000	50	44	64	103	15	34	48	69
July 31	71,489,000	(1)	(1)	69	109	17	42	51	(1)
Aug. 31	74,312,000	53	50	65	103	13	33	55	71
Sept. 30	76,026,000	46	44	63	110	10	30	52	68
Oct. 31	78,897,000	47	43	57	109	10	28	64	67
Nov. 30	78,976,000	47	38	52	102	10	24	62	64
Dec. 31	78,008,000	46	32	52	99	9	26	62	62
1957									
Jan. 31	73,182,000	42	27	45	86	4	25	53	53
Feb. 28	71,508,000	42	29	45	91	5	28	50	55
Mar. 31	72,160,000	44	33	49	98	6	25	49	60
Apr. 30	73,548,000	45	38	52	108	7	28	50	66
May 31	76,307,000	47	44	58	115	14	30	55	73
June 30	78,531,000	48	61	62	117	18	36	61	76
July 31	75,260,000	40	52	62	118	19	33	94	76
Aug. 31	77,889,000	43	55	59	117	14	30	53	73
Sept. 30	80,021,000	45	47	58	121	12	32	58	74
Oct. 31	81,583,000	50	37	50	117	8	31	59	71
Nov. 30	81,520,000	53	31	48	115	9	31	59	71
Dec. 31	80,779,000	60	30	48	114	7	34	58	71

[1] Figures on days' supply not calculated owing to low consumption caused by strike.

PRICES

TABLE 55.—Average value per ton, f. o. b. mines, of bituminous coal and lignite produced in the United States, 1956–57, by States

State	1956				1957			
	Underground mines	Strip mines	Auger mines	Total, all mines	Underground mines	Strip mines	Auger mines	Total, all mines
Alabama	$6.51	$5.13	$5.40	$6.26	$6.74	$5.25	$3.40	$6.49
Alaska	9.00	8.64	--------	8.77	8.41	8.80	--------	8.66
Arizona	6.56	--------	--------	6.56	7.02	--------	--------	7.02
Arkansas	8.13	7.36	--------	7.80	8.55	6.89	--------	7.83
California (lignite)	--------	10.00	--------	10.00	--------	--------	--------	--------
Colorado	5.86	3.93	--------	5.66	6.36	3.57	--------	6.08
Georgia	5.00	5.00	--------	5.00	4.65	--------	--------	4.65
Illinois	3.84	3.84	--------	3.84	4.02	3.97	--------	4.00
Indiana	4.02	3.63	--------	3.75	4.19	3.79	--------	3.92
Iowa	4.04	3.34	--------	3.48	4.06	3.31	--------	3.46
Kansas	5.63	4.34	--------	4.36	5.69	4.43	--------	4.45
Kentucky	4.78	3.25	5.04	4.44	4.91	3.38	3.86	4.53
Maryland	4.69	3.32	--------	4.01	5.21	3.28	--------	4.12
Missouri	5.15	3.98	--------	4.03	4.26	4.23	--------	4.26
Montana:								
Bituminous	5.17	3.21		4.11	5.83	4.65	--------	5.33
Lignite	3.83	3.43	--------	3.70	4.03	3.38	--------	3.80
Total, Montana	5.11	3.21	--------	4.10	5.71	4.59	--------	5.23
New Mexico	5.74	6.82	--------	5.82	6.04	6.13	--------	6.05
North Dakota (lighite)	3.61	2.33	--------	2.34	4.11	2.32	--------	2.32
Ohio	4.42	3.50	3.42	3.82	4.65	3.64	3.71	3.96
Oklahoma	8.11	5.51	--------	6.15	8.91	5.84	--------	6.45
Pennsylvania	5.82	3.90	3.33	5.31	6.34	4.10	3.55	5.77
South Dakota (lignite)	--------	3.66	--------	3.66	--------	3.75	--------	3.75
Tennessee	4.18	3.66	3.04	4.02	4.25	3.38	2.88	3.92
Utah	5.28	--------	--------	5.28	5.87	--------	--------	5.87
Virginia	5.02	3.90	3.96	4.92	5.33	3.96	4.11	5.22
Washington	7.27	7.12	--------	7.26	7.68	7.30	--------	7.66
West Virginia	5.41	4.21	4.33	5.29	5.71	4.43	4.48	5.58
Wyoming	5.94	2.51	--------	3.89	6.37	2.48	--------	3.67
Total	5.20	3.74	4.17	4.82	5.52	3.89	4.12	5.08

TABLE 56.—Production and average value per ton, f. o. b. mines, sold in open market and not sold in open market, 1957, by States

State	Production (net tons)			Average value per ton, f. o. b. mines		
	Sold in open market	Not sold in open market	Total	Sold in open market	Not sold in open market	Total
Alabama	4,343,936	8,915,566	13,259,502	$5.15	$7.15	$6.49
Alaska	841,937	401	842,338	8.66	9.61	8.66
Arizona	4,206	4,695	8,901	5.37	8.50	7.02
Arkansas	507,517	214	507,731	7.83	3.86	7.83
Colorado	2,291,666	1,301,963	3,593,629	5.10	7.80	6.08
Georgia	13,464		13,464	4.65		4.65
Illinois	45,940,570	1,052,455	46,993,025	4.01	3.34	4.00
Indiana	15,836,275	5,013	15,841,288	3.92	3.75	3.92
Iowa	1,311,675		1,311,675	3,46		3.46
Kansas	749,001		749,001	4.45		4.45
Kentucky	66,119,774	8,547,022	74,666,796	4.32	6.15	4.53
Maryland	748,298		748,298	4.12		4.12
Missouri	2,975,582	140	2,975,722	4.26	5.34	4.26
Montana:						
Bituminous	223,018	164,311	387,329	5.83	4.65	5.33
Lignite	25,572		25,572	3.80		3.80
Total, Montana	248,590	164,311	412,901	5.62	4.65	5.23
New Mexico	122,015	15,136	137,151	6.12	5.49	6.05
North Dakota (lignite)	2,412,841	147,811	2,560,652	2.34	2.05	2.32
Ohio	33,225,446	3,636,161	36,861,607	4.07	3.00	3.96
Oklahoma	1,772,164	423,095	2,195,259	5.89	8.82	6.45
Pennsylvania	50,094,286	35,270,968	85,365,254	5.14	6.67	5.77
South Dakota (lignite)	21,018	100	21,118	3.75	3.00	3.75
Tennessee	7,758,806	196,282	7,955,088	3.90	4.64	3.92
Utah	3,568,909	3,289,388	6,858,297	5.12	6.68	5.87
Virginia	29,300,473	205,106	29,505,579	5.21	5.78	5.22
Washington	346,372	13,964	360,336	7.60	9.15	7.66
West Virginia	138,073,709	18,768,329	156,842,038	5.48	6.32	5.58
Wyoming	1,266,729	850,537	2,117,266	3.35	4.15	3.67
Total	409,895,259	82,808,657	492,703,916	4.82	6.37	5.08

LIGNITE

TABLE 57.—Summary of number of mines, production, value, men working daily, days operated, number of man-days worked, output per man per day, and detailed operations at underground and strip lignite mines in the United States, 1957, by States [1]

Item	Montana	North Dakota	South Dakota	Total
OPERATIONS AT UNDERGROUND MINES				
Number of mines	5	2		7
Shot from solid net tons	16,382	2,836		19,218
Cut by machines do		1,182		1,182
Total production do	16,382	4,018		20,400
Number of cutting machines		1		1
Average output per machine net tons		1,182		1,182
Underground production cut by machine percent		29.4		5.8
Average value per ton	$4.03	$4.11		$4.05
Average number of men working daily	21	8		29
Average number of days worked	116	92		110
Number of man-days worked	2,445	733		3,178
Average tons per man per day	6.70	5.48		6.42
OPERATIONS AT STRIP MINES				
Number of strip mines	5	36	1	42
Production net tons	9,190	2,556,634	21,118	2,586,942
Average value per ton	$3.38	$2.32	$3.75	$2.33
Number of shovels and draglines	4	52	3	59
Average number of men working daily	11	358	10	379
Average number of days worked	113	197	240	196
Number of man-days worked	1,240	70,527	2,397	74,164
Average tons per man per day	7.41	36.25	8.81	34.88
TOTAL OPERATIONS AT ALL LIGNITE MINES				
Number of mines	10	38	1	49
Production (net tons):				
Shipped by rail [2]		1,900,748		1,900,748
Shipped by truck or wagon	25,530	351,957	21,018	398,505
Used at mines [3]	42	307,947	100	308,089
Total	25,572	2,560,652	21,118	2,607,342
Average value per ton	$3.80	$2.32	$3.75	$2.35
Average number of men working daily	32	366	10	408
Average number of days worked	115	195	240	190
Number of man-days worked	3,685	71,260	2,397	77,342
Average tons per man per day	6.94	35.93	8.81	33.71

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[1] Exclusive of Texas (lignite).

[2] Includes coal loaded at mines directly into railroad cars and hauled by trucks to railroad sidings.

[3] Includes coal transported from mines to point of use by conveyor belts or trams, used by mine employees, taken by locomotive tenders at tipples, used at mines for power and heat, made into beehive coke at mines, and all other uses at mines.

FOREIGN TRADE[3]

Imports of bituminous coal and lignite are very small, although exports have been an important item of foreign trade for many years, particularly since the close of World War II. A detailed analysis of

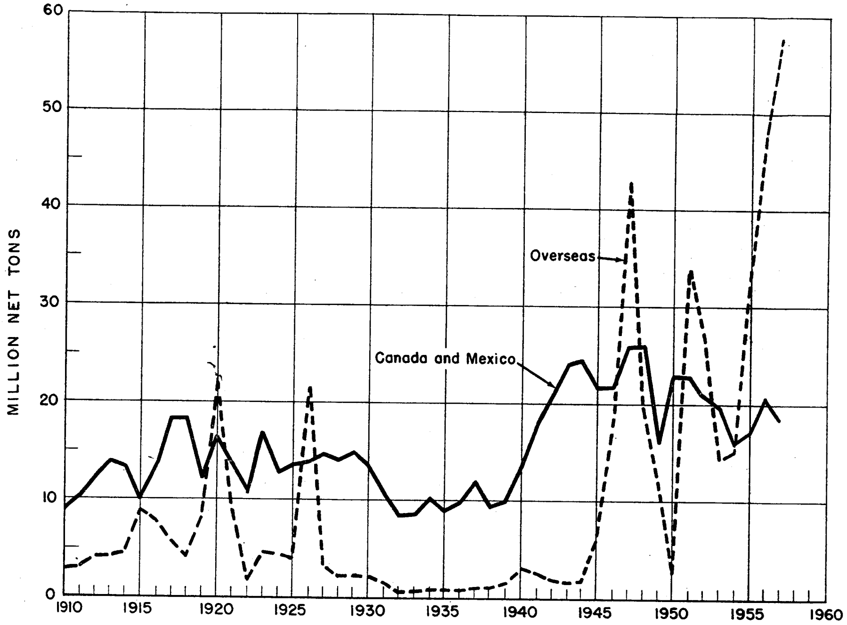

FIGURE 16.—Exports of bituminous coal and lignite from the United States to Canada and Mexico and overseas, 1910–57.

TABLE 58.—Bituminous coal[1] imported for consumption in the United States, 1955–57, by countries and customs districts, in net tons

[Bureau of the Census]

	1955	1956	1957
COUNTRY			
North America: Canada	337,145	353,899	366,506
Europe: Germany, West		1,802	
Total	337,145	355,701	366,506
CUSTOMS DISTRICT			
Alaska	370	260	202
Duluth and Superior	89	90	
Maine and New Hampshire	187,540	212,119	217,376
Michigan	53		
Montana and Idaho	148,045	137,264	137,418
New York		386	1,648
North Carolina		355	
St. Lawrence		64	
Washington	1,048	5,163	9,862
Total	337,145	355,701	366,506

[1] Includes slack, culm, and lignite.

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[3] Figures on imports and exports compiled by M. B. Price and E. D. Page, of the Bureau of Mines, from records of the Bureau of the Census, U. S. Department of Commerce.

exports and imports of bituminous coal and lignite is presented in Minerals Yearbook, volume II, 1953, pages 146–150.

TABLE 59.—Exports of bituminous coal, by country groups, 1948–52 (average) and 1953–57, in thousand net tons

[Bureau of the Census]

Year	Canada (including Newfoundland) and Mexico	West Indies and Central America [1]	Overseas (all other countries)							Grand total
			Miquelon, Bermuda, and Greenland	South America	Europe	Asia	Africa	Oceania	Total overseas	
1948–52 (average)	21,783	133	6	1,857	14,833	1,450	628	31	18,805	40,721
1953	19,626	69	2	1,747	8,312	3,915	89	--------	14,065	33,760
1954	15,964	58	(2)	1,385	10,471	3,049	114	--------	15,019	31,041
1955	17,232	51	6	1,447	28,677	3,726	138	--------	33,994	51,277
1956	20,705	40	2	[3] 2,828	41,156	3,509	313	--------	47,808	68,553
1957	18,458	35	4	2,268	49,633	5,673	271	--------	57,849	76,342

[1] Includes Bahamas and Panama.
[2] Less than 1,000 tons.
[3] Revised figure.

TABLE 60.—Bituminous coal exported from the United States, 1954–57, by countries, in net tons [1]

[Bureau of the Census]

Country	1954	1955	1956	1957
North America:				
Bermuda	595	1,911	2,350	1,134
Canada	15,910,572	17,185,204	20,654,885	18,410,076
Central America:				
Costa Rica	----------	25	125	----------
El Salvador	140	----------	245	120
Guatemala	150	290	1,032	360
Honduras	25	90	50	140
Other Central America	----------	25	----------	25
Greenland	----------	4,485	----------	2,264
Mexico	52,915	46,548	50,059	47,913
West Indies:				
British:				
Jamaica	14,451	12,631	5,468	51
Trinidad and Tobago	2,566	3,398	1,975	2,237
Cuba	39,278	30,804	27,863	30,905
Dominican Republic	75	75	548	230
French	1,303	3,304	2,249	1,259
Haiti	----------	150	----------	----------
Total North America	16,022,070	17,288,940	20,746,849	18,496,714
South America:				
Argentina	8,795	64,743	[2] 1,518,775	914,006
Bolivia	----------	13,538	14,454	1,203
Brazil	1,073,991	1,115,433	969,383	1,059,802
Chile	214,379	139,285	222,819	194,333
Peru	----------	----------	----------	3,390
Surinam	4,413	2,689	----------	----------
Uruguay	83,066	111,433	101,634	95,564
Other South America	101	50	116	127
Total South America	1,384,745	1,447,171	[2] 2,827,181	2,268,425

See footnotes at end of table.

TABLE 60.—Bituminous coal exported from the United States, 1954–57, by countries, in net tons [1]—Continued

[Bureau of the Census]

Country	1954	1955	1956	1957
Europe:				
Austria	421, 543	809, 807	1, 353, 150	926, 780
Azores	----------	----------	----------	2, 390
Belgium-Luxembourg	265, 118	1, 142, 452	1, 858, 989	2, 146, 214
Denmark	224, 622	357, 752	363, 954	352, 384
Finland	9, 284	188, 772	421, 773	242, 266
France	68, 861	1, 016, 888	6, 589, 043	7, 092, 989
Germany, West	1, 383, 979	6, 678, 504	10, 243, 077	15, 546, 486
Gibraltar	----------	22, 355	23, 663	22, 305
Greece	30, 849	151, 934	127, 613	212, 043
Hungary	----------	----------	----------	167, 819
Iceland	----------	6, 417	7, 180	8, 447
Italy	3, 542, 830	6, 056, 130	7, 556, 640	8, 750, 820
Netherlands	1, 944, 583	4, 641, 931	6, 593, 850	8, 062, 538
Norway	206, 827	459, 956	392, 258	359, 439
Poland and Danzig	----------	----------	----------	85, 388
Portugal	41, 849	76, 317	204, 153	303, 744
Spain	275, 236	433, 096	358, 707	757, 629
Sweden	429, 676	656, 223	903, 947	1, 282, 666
Switzerland	194, 186	58, 552	266, 989	402, 483
Trieste	242, 511	378, 709	501, 088	648, 835
United Kingdom	461, 091	4, 850, 677	2, 754, 117	1, 748, 879
Yugoslavia	728, 193	690, 284	636, 302	510, 234
Total Europe	10, 471, 238	28, 676, 756	41, 156, 493	49, 632, 778
Asia:				
Indonesia	14, 536	45, 409	47, 695	44, 170
Israel	1, 290	795	2, 259	1, 903
Japan	2, 921, 144	2, 760, 495	3, 178, 329	4, 872, 589
Korea, Republic of	111, 608	919, 129	280, 257	754, 645
Pakistan	----------	----------	25	19
Other Asia	----------	32	325	13
Total Asia	3, 048, 578	3, 725, 860	3, 508, 890	5, 673, 339
Africa:				
Algeria	----------	----------	58, 097	138, 928
Angola	56, 462	65, 302	128, 763	26, 125
Belgian Congo	16, 409	21, 033	----------	----------
Canary Islands	----------	12, 830	8, 375	12, 382
Egypt	30, 519	31, 772	49, 454	34, 810
Ethiopia	10, 543	----------	10, 894	----------
Madeira Island	----------	1, 680	4, 149	1, 350
Morocco	----------	----------	[3] 22, 316	11, 496
Libya	----------	----------	14, 416	32, 159
Tunisia	----------	----------	11, 340	13, 806
Other Africa	----------	5, 912	5, 412	----------
Total Africa	113, 933	138, 529	313, 216	271, 056
Grand total	31, 040, 564	51, 277, 256	[2] 68, 552, 629	76, 342, 312

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[1] Amounts stated do not include fuel or bunker coal loaded on vessels engaged in foreign trade, which aggregated 427,072 tons in 1954, 444,806 tons in 1955, 498,967 tons in 1956, and 419,360 tons in 1957.

[2] Revised figure.

[3] French Morocco.

TABLE 61.—Bituminous coal exported from the United States, 1954–57, by customs districts, in net tons

[Bureau of the Census]

Customs district	1954	1955	1956	1957
North Atlantic:				
Connecticut	-------	-------	-------	61
Maine and New Hampshire	5,790	13,296	1,383	12,165
Massachusetts	3,608	47	2,274	7,341
New York	297	4,072	1,675	3,282
Philadelphia	17,787	201,844	464,432	617,457
Rhode Island	-------	-------	-------	3,121
South Atlantic:				
Maryland	627,921	3,643,684	4,789,671	4,913,765
North Carolina	-------	-------	-------	46
Virginia	14,262,824	29,398,882	[1] 42,158,581	51,144,048
Gulf Coast:				
Florida	49	-------	-------	99
Galveston	-------	119	77	66
Mobile	234,389	648,862	241,002	123,399
New Orleans	260	43,473	155	11,761
Sabine	1,781	-------	-------	-------
Mexican border:				
Arizona	64	105	88	49
El Paso	9,263	272	2,038	4,556
Laredo	28	327	180	142
Pacific Coast:				
Los Angeles	5,600	33,187	-------	45,403
Oregon	-------	20,157	-------	555,524
San Diego	50	76	-------	66
San Francisco	-------	43,615	-------	143,427
Washington	2,030	67,413	426	99,832
Northern border:				
Buffalo	603,415	460,188	346,235	276,140
Chicago	640,837	891,817	1,081,059	710,269
Dakota	43,675	30,967	16,866	30,820
Duluth and Superior	37,228	61,209	171,942	66,187
Michigan	2,064,034	1,995,191	1,152,505	1,141,216
Minnesota	-------	53	-------	-------
Montana and Idaho	593	298	286	158
Ohio	9,538,246	10,682,968	11,871,058	11,984,090
Rochester	1,737,287	1,964,639	2,773,170	2,888,032
St. Lawrence	1,132,094	983,437	738,873	1,178,122
Vermont	1,444	1,326	-------	-------
Miscellaneous:				
Alaska	-------	205	-------	-------
Pittsburgh	-------	11,117	-------	-------
Total [2]	31,040,564	51,277,256	[1] 68,552,629	76,342,312

[1] Revised figure.

[2] Includes 69,970 tons in 1954, 74,410 tons in 1955, 2,738,653 tons in 1956 and 381,668 tons in 1957, representing estimated data for which district breakdown is not available.

TABLE 62.—Shipments of bituminous coal to possessions and other areas administered by the United States, 1955–57, in net tons

[Bureau of the Census]

Territory	1955	1956	1957
Guam	1	6	4
Puerto Rico	4,517	7,610	4,555
Virgin Islands	3	-------	-------

WORLD PRODUCTION

The United States supplied 533 million tons of bituminous coal, anthracite, and lignite—21 percent of the world output—in 1957.

Most coal-producing countries in Europe enjoyed slightly increased production during 1957; however, consumption requirements of the principal coal-producing countries on the European Continent exceeded available supplies. Production from the United States made up a large part of the deficit.

TABLE 63.—World production of bituminous coal, anthracite, and lignite, by countries, 1953–57, in thousand short tons [1]

[Compiled by Pearl J. Thompson]

Country	1953	1954	1955	1956	1957 [2]
North America:					
Canada:					
Bituminous	13,879	12,797	12,525	12,574	10,940
Lignite	2,021	2,117	2,294	2,342	2,249
Greenland: Bituminous [3]	8	8	8	8	8
Mexico: Bituminous	1,579	1,448	1,479	1,552	1,566
United States:					
Anthracite (Pennsylvania)	30,949	29,083	26,205	28,900	25,338
Bituminous	454,439	389,157	461,468	497,997	490,097
Lignite	2,851	2,843	3,166	2,878	2,607
Total	505,726	437,453	507,145	546,251	532,805
South America:					
Argentina: Bituminous	91	103	150	169	224
Brazil: Bituminous (including lignite)	2,232	2,265	2,500	2,461	2,535
Chile: Bituminous (mined)	2,586	2,499	2,544	2,511	2,425
Colombia: Bituminous	1,357	1,653	1,984	2,094	[3] 2,480
Peru: Bituminous and anthracite	231	174	93	115	132
Venezuela: Bituminous	32	35	33	34	39
Total	6,529	6,729	7,304	7,384	7,835
Europe:					
Albania: Lignite	119	169	220	[3] 255	260
Austria:					
Bituminous	179	195	188	183	168
Lignite	6,144	6,928	7,296	7,419	7,581
Belgium: Bituminous and anthracite	33,135	32,241	33,045	32,579	32,062
Bulgaria:					
Anthracite	[3] 33	[3] 33	132	137	[3] 150
Lignite (including bituminous)	8,818	9,480	11,023	10,924	12,015
Czechoslovakia:					
Bituminous	22,377	23,810	23,262	24,795	26,655
Lignite	37,919	40,675	42,012	47,267	56,235
Denmark: Lignite	880	754	839	1,534	[3] 2,100
France:					
Bituminous and anthracite	57,977	59,981	60,997	60,768	62,606
Lignite	2,147	2,105	2,263	2,487	2,528
Germany:					
Bituminous and anthracite:					
East	2,908	2,919	2,956	3,024	3,035
West	138,509	142,233	145,250	149,427	148,068
Lignite:					
East	190,426	200,525	221,137	226,928	234,346
West	93,354	96,797	99,579	104,976	106,716
Pech coal: West	1,855	1,905	2,003	1,979	2,048
Greece: Lignite	489	772	862	880	992
Hungary:					
Bituminous	2,197	2,684	2,967	2,619	2,510
Lignite	20,962	21,055	21,632	20,080	20,856
Ireland: Bituminous and anthracite	184	226	222	239	278
Italy:					
Bituminous and anthracite	1,247	1,184	1,251	1,188	1,128
Lignite	836	710	462	502	425
Netherlands:					
Bituminous	13,555	13,306	13,112	13,047	12,540
Lignite	278	190	281	298	317
Poland:					
Bituminous	97,776	100,972	104,142	104,884	103,723
Lignite	6,173	6,504	6,663	6,816	6,563
Portugal:					
Bituminous and anthracite	527	476	445	456	549
Lignite	78	72	97	161	203
Rumania:					
Bituminous and anthracite [3]	440	440	210	210	7,700
Lignite [3]	5,500	5,600	6,500	6,900	
Saar: Bituminous	18,098	18,539	19,102	18,838	18,139
Spain:					
Bituminous and anthracite	13,663	13,891	13,917	14,165	15,349
Lignite	1,974	1,933	2,024	2,125	2,769
Svalbard (Spitsbergen): Bituminous [4]	761	686	697	763	[3] 870
Sweden: Bituminous	314	294	311	324	335
Switzerland: Bituminous and anthracite (including lignite) [3]	11	11	11	11	11
U. S. S. R.:					
Bituminous and anthracite	247,265	268,612	304,941	334,772	360,455
Lignite	105,940	114,010	126,348	138,340	149,914

For footnotes, see end of table.

TABLE 63.—World production of bituminous coal, anthracite, and lignite, by countries, 1953–57, in thousand short tons [1]—Continued

Country	1953	1954	1955	1956	1957 [2]
Europe—Continued					
United Kingdom: Bituminous and anthracite	251,110	250,942	248,188	248,646	250,462
Yugoslavia:					
Bituminous	1,020	1,089	1,250	1,358	1,353
Lignite	11,377	13,972	15,510	17,493	18,497
Total	1,398,555	1,458,920	1,543,347	1,609,797	1,672,511
Asia:					
Afghanistan: Bituminous	18	17	25	26	30
China: Bituminous, anthracite, and lignite	73,400	88,100	102,700	116,700	141,800
India: Bituminous	40,298	41,310	42,813	44,162	48,720
Indonesia: Bituminous	989	992	897	914	788
Iran: Bituminous [5]	171	278	270	209	[3] 165
Japan:					
Bituminous and anthracite	51,292	47,088	46,763	51,318	57,025
Lignite	1,638	1,592	1,508	1,676	1,832
Korea:					
Anthracite:					
North [3]	1,100	1,200	1,300	1,500	1,600
Republic of	956	982	1,442	2,003	2,691
Lignite, North [3]	440	660	2,200	2,300	2,800
Malaya: Bituminous	321	251	230	204	171
Pakistan: Bituminous	654	621	608	722	769
Philippines: Bituminous	171	132	143	168	211
Taiwan: Bituminous	2,638	2,329	2,600	2,788	3,214
Thailand: Lignite	1	7	44	96	110
Turkey (mined):					
Bituminous	6,232	6,299	6,070	6,490	6,557
Lignite	1,809	2,315	2,663	3,318	3,926
U. S. S. R., including Sakhalin, southern: Bituminous	(6)	(6)	(6)	(6)	(6)
Vietnam:					
North: Anthracite	978	1,099	1,213	1,213	[3] 1,200
South: Anthracite	----------	----------	----------	2	13
Total	183,106	195,272	213,489	235,809	273,622
Africa:					
Algeria: Bituminous and anthracite	325	334	333	327	260
Belgian Congo: Bituminous	347	418	529	463	477
Madagascar: Bituminous	6	1	----------	----------	1
Morocco: Southern zone: Anthracite	623	536	515	531	574
Mozambique: Bituminous	179	157	191	240	298
Nigeria: Bituminous	785	712	839	882	913
Rhodesia and Nyasaland, Federation of Southern Rhodesia: Bituminous	2,887	3,029	3,654	3,918	4,247
Tanganyika: Bituminous	----------	1	1	1	1
Union of South Africa: Bituminous and anthracite (marketable)	31,371	32,314	35,436	37,040	38,325
Total	36,523	37,502	41,498	43,402	45,096
Oceania:					
Australia:					
Bituminous	20,620	22,134	21,588	21,587	22,175
Lignite	9,248	10,451	11,326	11,827	12,030
New Zealand:					
Bituminous and anthracite	868	912	877	897	931
Lignite	1,954	1,994	1,985	2,046	1,994
Total	32,690	35,491	35,776	36,357	37,130
Other countries (estimate)	110	110	110	110	110
World total all grades (estimate)	2,163,239	2,171,477	2,348,669	2,479,110	2,569,109
Lignite (total of items shown above) (estimate)	513,376	544,230	589,934	621,868	657,565
Bituminous and anthracite (by subtraction)	1,649,863	1,627,247	1,758,735	1,857,242	1,911,544

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[1] This table incorporates a number of revisions of data published in previous Coal chapters.
[2] Preliminary.
[3] Estimate.
[4] Includes the following quantities, in thousand short tons, produced in U. S. S. R.-controlled mines: 1953, 290; 1954, 311; 1955, 342; 1956, 386; and 1957, 440 (estimated).
[5] Year ended March 20 of year following that stated.
[6] Output from U. S. S. R. in Asia included with U. S. S. R. in Europe.

TECHNOLOGY

Continued progress in coal research during 1957 was reported by the major contributors—the Bureau of Mines; Bituminous Coal Research, Inc.; the Federal Geological Survey; the Geological Survey groups of coal-producing States; the professional staffs of a number of universities; individual coal-producing companies; independent research organizations; other Government agencies; and equipment manufacturers.

The importance of coal research to the economic well-being of the industry was highlighted by the series of hearings conducted by a Special Subcommittee on Coal Research under an authorization of the House Committee on Interior and Insular Affairs. Based upon the recommendation of the Special Subcommittee, a number of bills were introduced in both the House and the Senate calling for establishment of a commission-type Federal agency to coordinate and administer an expanded coal-research program financed by an annual appropriation from the Congress.

Further substantiation of the use of research as a tool to promote economic growth of the coal industry was the special research appropriation by the State of Pennsylvania for State-supported research on bituminous coal and anthracite. Investigations under this special grant were designed to expand the present market for these solid fuels and to develop new uses. The research program includes an investigation of the effects of radiation on coal and its byproducts.

Strip mines have always held an advantage over underground mines with respect to output per man-day. At present, the average output per man per day at bituminous-coal and lignite strip mines in the United States is about twice that in underground mines. As the strippable coal beds under relatively shallow cover become depleted, industry has been forced to develop larger and larger capacity equipment to permit economic extraction of coal by stripping under heavier and heavier overburden. The trend toward the use of high-capacity equipment has become well established, and during 1957 the world's largest stripping shovel was placed in operation. Operating in an area where overburden depths may reach 100 feet, this shovel, equipped with a 70-cubic-yard dipper, is exposing a 6- to 10-foot coal bed. Less than 1 minute is required to remove 105 tons of overburden.

Likewise in underground mines greater productivity is being achieved by increased mechanization. During the year new continuous-type mining machines were introduced that are particularly adapted to thin-bed operation. These new units can be operated successfully in beds having a minimum thickness of 30 inches. Since high productivity is most difficult in thin coal, the new continuous miners may have a very salutary effect on the productivity of the Nation's coal mines.

To assist the coal industry in achieving more efficient face haulage under highly mechanized conditions, the Bureau of Mines made comparative studies of various combinations of equipment to determine that most suitable for use under a variety of mining conditions.

In the interests of conservation, the Bureau cooperated with industry to determine the relationship of mining method to percentage of recovery of coal from the bed. Investigations were made of the percentage of coal recovered at each of several mines working the same bed by a number of different mining methods.

To increase safety of miners and to improve underground working conditions at the face, a fluorescent lighting system has been introduced that will give intense illumination and is safe for use, even in gassy atmospheres.

Foreign technical articles indicated that the extraction of coal from the bed, using high-pressure water jets, was being done successfully in the Soviet Union, Poland, and New Zealand. The broken coal is flumed away from the working face to a central sump from which it is hoisted hydraulically to the surface. The reports describing this new mining technique claim marked increase in productivity by hydraulic extraction over conventional mining methods.

Following successful installation last year in the Pacific Northwest of the first modern feldspar jig in the United States, based upon earlier experimental studies of the unit by the Bureau of Mines, another feldspar jig has been placed in operation in West Virginia. The feldspar jig is a fine-coal washer that has become very popular in other coal-producing countries, since it is an efficient unit with a relatively low space requirement based upon throughput.

To increase the capacity of the coal-washing table without a commensurate increase in floor-space requirements, a double-decked table was introduced in 1957. Test data, based upon plant operation, indicate that the increased capacity is achieved without impairing normal operational efficiency. The coal-washing table has attained a high degree of popularity in the United States for cleaning the fine sizes of coal.

In the mechanical cleaning of coarse coal, new large-capacity units were developed, using conventional operational techniques. The capacity of the jig (a coal-cleaning unit that prepared at least 44 percent of the mechanically cleaned coal in 1957) has been increasing steadily. Large jigs capable of handling up to 1,000 tons of raw feed per hour in a single unit are being installed.

A new type of screen, developed by the Dutch State Mines, is undergoing tests to determine its application in this country's coal-preparation practice. The screen is stationary, contains no moving parts, and provides high capacity per unit of space required. Based upon test data from foreign installations, the DSM screen appears capable of effective screening in the very fine size range where it is most difficult to achieve efficient operation with conventional screens.

The Denver & Rio Grande Western Railroad announced that gamma rays from nuclear reactor wastes had been used successfully to comminute coal particles. Coal particles in the 200-mesh size range were shattered during irradiation into finer particles 1 micron or less in size. The irradiated coal dust is being added to diesel oil, and tests are underway to determine the suitability of the mixture as locomotive fuel.

To supply a satisfactory char for use in electric-furnace production of phosphorous and in the roasting and smelting of nonferrous ore, a medium-temperature carbonization plant started operating in Montana. Starting with a process feed of 40 tons of coal per day, the capacity of the plant is expected to increase with the installation of additional carbonizing retorts. Char containing about 4 percent volatile matter and tar, creosote, and light oil are produced during carbonization.

One of the major cost items in the delivered price of coal to the consumer is the transportation charge from mine to market. It is a cost item over which the coal producer usually has no control. To overcome this deficiency the Consolidation Coal Company constructed a 108-mile coal pipeline from its mine in eastern Ohio to the East Lake powerplant of the Cleveland Electric Illuminating Company near Cleveland, Ohio. The line has been placed in operation delivering 14-mesh-by o-size coal. The design capacity of the line is 3,600 tons per day.

Bureau of Mines studies of the feasibility of hydraulic transportation of a Texas lignite indicated that, with the test coal and under the test conditions severe degradation would occur. Hydraulic transportation over a distance was simulated by circulating the coal feed through a closed pipeline system. Similar tests with a Colorado bituminous coal showed that size reduction during transit probably would preclude hydraulic transportation of this coal under the present established freight-rate structure for coal transportation.

Coal is being hoisted hydraulically from the mine to the surface on an experimental basis in Europe. Preliminary tests have begun in the United States to determine the economic feasibility of adapting the method to American mining conditions.

In Germany successful experimental studies have indicated the possibility of hoisting coal pneumatically in pipelines. At the experimental installation coal is being hoisted from a depth of 100 meters at a rate of 50 tons per hour. The feed to the pipeline is limited to 1-inch top size, and considerable size reduction occurs during transit. The process air, after separation from the entrained coal on the surface, is returned underground, filtered, and used again as the conveying medium.

Continued improvement in combustion efficiencies at electric-utility powerplants was achieved through more advanced boiler design and the use of increased steam pressure up to and including the supercritical.

A fully automatic, coal-fired, package-boiler plant, utilizing a water-cooled pulsating grate, was designed and built by Bituminous Coal Research, Inc. The design of the equipment was engineered for unit installation in commercial and small industrial plants. The units can be manufactured for requirements ranging from 1,500 to 20,000 pounds of steam per hour and pressures up to 300 pounds per square inch. They are applicable for space heating, process hot water, and high-pressure process steam installations.

During 1957 a major breakthrough was announced in fuel-cell conversion of hydrogen and oxygen to electricity. Technologic advancement involved perfection of a specially catalyzed porous-carbon electrode. These electrodes are sealed in a bath of potassium hydroxide electrolyte. Oxygen diffusing through the positive electrode and hydrogen through the negative electrode establishes a 1-volt potential difference enabling a current to flow through electrolytic action. The cell was developed for the Army to provide a completely noiseless generator for portable radar sets.

High-grade benzene, toluene, and xylene have been obtained directly from light oil produced during coal carbonization by a major steel producer in the Pittsburgh (Pa.) area. Advanced distillation techniques achieve a purity of the recovered products that exceeds standard specifications of the chemical and allied industries. Contaminating sulfur compounds are removed by catalytic hydrogenation. The new plant has a rated capacity of 55,000 gallons of light oil per day.

A detailed report on coal technological activities of the Bureau of Mines is published annually.

Coal—Pennsylvania Anthracite

By J. A. Corgan, J. A. Vaughan, and Marian I. Cooke

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GENERAL SUMMARY

PRODUCTION of Pennsylvania anthracite in 1957 declined to 25.3 million tons—12 percent below 1956 and the lowest annual output since 1878. The value of the 1957 tonnage at the preparation plant was $227.8 million, or 4 percent lower than in 1956. The smaller proportional decline in value resulted from price increases near the close of 1956 to cover the higher wages paid by the industry under the new wage agreement and to the steady increase in the value of the small sizes. The average net realization on the total tonnage produced in 1957 advanced to $8.99 per ton, compared with $8.19 in 1956.

Anthracite production in 1957 resumed the downtrend that has persisted since 1946, except for 1956, when output increased over that in the preceding year. Demand declined in all important areas of consumption. The total apparent consumption within the United States fell to 20.8 million tons—13 percent less than in 1956. This decline resulted principally from the lowered heat demand (warmer weather) and continued losses to competitive fuels. Exports to all destinations were down more than 900,000 tons in 1957 due to a 25-percent decline in shipments to Canada and a 14-percent decrease in shipments to Europe. The export market fell off appreciably in the last quarter of 1957, and the monthly average for that period was only 280,000 tons, compared with 388,000 during the first three quarters of the year.

The greater part of the decline in consumption within the United States probably was in anthracite used for heating and other domestic purposes. Some of this reduction undoubtedly was caused by generally warmer weather, with resultant lower heat demand (degree-days) than in 1956. According to the Anthracite Institute, heat demand in the anthracite-burning area in 1957 averaged 7 percent less than in 1956 and 6 percent less than in a year of normal temperature (average 1921–50). January and October were the only important heating months, with appreciably higher heat demands than in 1956. However, there doubtless was continued substantial loss to competing fuels in this market area. This is indicated by the increasing availability of natural gas in the New England and Middle Atlantic States. For example, the Federal Power Commission in January 1957 gave final approval for delivery of natural gas for consumption in the Scranton-Wilkes-Barre area, previously served with manufactured gas.

Of the known industrial consumption of anthracite within the United States, some uses increased, and others declined. Anthracite used by electric power utilities—the largest industrial consumers—advanced slightly over 1957; likewise, a slight gain was reported as an admixture with bituminous coal in the manufacture of oven coke. Although comparable data are not available, there was a probable increase in the tonnage used in pelletizing and sintering iron ores due to the marked activity in processing iron-ore fines by the steel industry. On the other hand, consumption of anthracite by the railroads, in briquet manufacture, and for colliery fuel declined in 1957.

Total shipments of anthracite from preparation plants and dredges to all destinations were 25.1 million tons in 1957. Shipments to

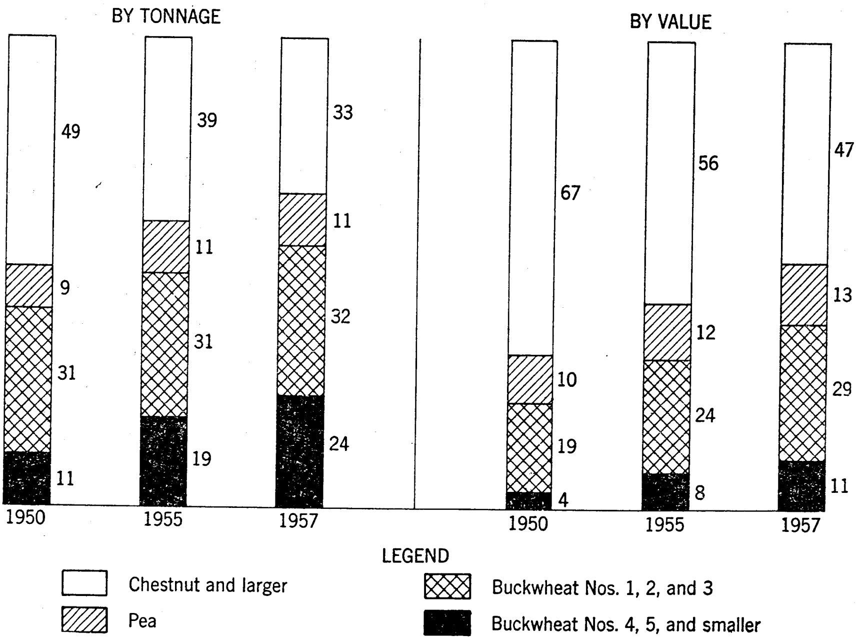

FIGURE 1.—Shipments of Pennsylvania anthracite, 1950, 1955, and 1957, by size groups, in percent of total tonnage and total value.

points within the local sales area were off only 5 percent, but those to points outside the producing area declined 14 percent from 1956. The greatest drop occurred in the Pea and larger group of sizes, which in 1957 represented 44 percent of total shipments, whereas in 1956 they were 48 percent of the total. However, the value of this group of sizes in 1957 was 61 percent of the total value of all shipments compared with 66 percent. Changes in the proportions of tonnage and value contributed by the various size groups in recent years are shown in figure 1.

Tables 1 and 2 present summarized data and developments in the anthracite industry, and table 3 shows pertinent historical data.

TABLE 1.—Salient statistics of the Pennsylvania anthracite industry, 1953–57

	1953	1954	1955	1956	1957
Production:					
Loaded at mines for shipment outside producing region:					
Breakers and washeries net tons	26,316,762	24,021,867	21,250,344	23,581,689	20,355,414
Dredges do	299,799	654,410	752,580	688,379	630,237
Sold to local trade and used by employees net tons	3,711,235	3,798,919	3,782,366	4,288,532	4,073,406
Used at collieries for power and heat net tons	621,356	608,281	419,264	341,620	279,264
Total production do	30,949,152	29,083,477	26,204,554	28,900,220	25,338,321
Value at breaker, washery, or dredge	$299,139,687	$247,870,023	$206,096,662	$236,785,062	$227,753,802
Average sales realization per net ton on breaker and washery shipments to points outside producing region:					
Domestic	$13.31	$11.67	$10.83	$11.50	$12.50
Steam	$6.37	$5.83	$5.05	$5.31	$6.38
Total all sizes	$9.87	$8.76	$8.00	$8.33	$9.11
Percentage of total breaker and washery shipments to points outside producing region:					
Domestic	50.4	50.1	51.0	48.8	44.6
Steam	49.6	49.9	49.0	51.2	55.4
Producers' stocks at end of year [1] net tons	1,915,919	1,292,922	719,569	341,505	499,620
Exports [2] do	2,724,270	2,851,239	3,152,313	5,244,349	4,331,785
Imports [2] do	31,443	5,831	170	46	1,138
Consumption (apparent) do	28,000,000	26,900,000	23,600,000	24,000,000	20,800,000
Average number of days worked	163	164	[3] 197	216	196
Average number of men working daily	57,862	43,996	[3] 33,523	31,516	30,825
Output per man per day net tons	3.28	4.02	[3] 3.96	4.25	4.18
Output per man per year do	535	659	[3] 780	918	819
Quantity cut by machines do	318,699	381,424	393,932	400,402	292,307
Quantity mined by stripping do	8,606,482	7,939,680	7,703,907	8,354,230	7,543,157
Quantity loaded by machines underground net tons	6,838,769	6,978,035	6,660,939	7,308,110	6,657,479
Distribution:					
Total receipts in New England [4] net tons	2,106,343	1,897,283	1,718,404	1,619,605	1,264,726
Exports to Canada [2] do	2,601,818	2,456,747	2,434,981	2,356,351	1,778,551
Loaded into vessels at Lake Erie [5] net tons	263,705	283,922	467,886	588,085	454,121
Receipts at Duluth-Superior [6] do	81,678	94,835	170,754	311,599	260,901

[1] Anthracite Committee.
[2] U. S. Department of Commerce.
[3] Estimated.
[4] Commonwealth of Massachusetts, Division on the Necessaries of Life, and Association of American Railroads.
[5] Ore and Coal Exchange, Cleveland, Ohio.
[6] U. S. Engineer Office, Duluth, Minn.

TABLE 2.—Statistical summary of monthly developments in the Pennsylvania anthracite industry in 1957

[All tonnage figures represent net tons]

	January	February	March	April	May	June	July	August	September	October	November	December	Year 1957	Change from 1956 (percent)	Year 1956
Production (including mine fuel, local sales, and dredge coal)	2,625,000	2,072,000	1,798,000	2,037,000	2,294,000	2,551,000	1,478,000	2,294,000	2,173,000	2,262,000	1,928,000	1,826,000	25,338,000	−12.3	28,900,000
Shipments (breakers and washeries only, all sizes):															
By rail [1]	1,791,891	1,323,311	1,198,898	1,349,997	1,502,693	1,858,544	1,106,799	1,864,305	1,540,370	1,458,375	1,237,582	1,156,611	17,389,376	−17.4	21,050,451
By truck [2]	1,063,288	813,619	641,159	774,924	691,198	640,681	420,997	654,110	555,625	686,724	660,678	762,917	8,365,920	+1.4	8,252,347
Carloadings [3]	32,864	26,087	24,292	27,083	29,416	36,986	21,403	34,359	30,294	30,022	24,323	22,272	339,401	−15.8	403,140
Distribution:															
Lake Erie loadings [4]	-------	-------	-------	55,405	85,161	39,996	69,138	114,170	43,038	34,920	12,293	-------	454,121	−22.8	588,085
Lake Ontario loadings [5]	-------	-------	-------	-------	-------	-------	-------	-------	-------	760	-------	-------	760	+9.0	697
Receipts at Duluth-Superior [6]	-------	-------	-------	33,923	55,747	29,328	69,893	48,507	4,624	18,879	-------	-------	260,901	−16.3	311,599
Upper Lake dock trade: [7]															
Receipts:															
Lake Superior	-------	57	-------	-------	-------	29,382	9,064	52,456	4,674	18,935	54	-------	114,622	−37.6	183,703
Lake Michigan	3,403	2,837	5,890	18,535	4,789	17,597	3,703	8,092	11,454	1,916	1,379	3,812	83,407	−26.5	113,540
Deliveries (reloadings):															
Lake Superior	14,001	9,619	2,750	3,274	6,049	10,756	17,962	14,288	9,840	12,898	9,517	9,443	120,397	−21.9	154,110
Lake Michigan	16,020	11,806	6,436	5,083	6,530	18,001	8,763	4,895	7,434	8,779	5,878	6,281	105,906	−20.6	133,327
New England receipts:															
Tidewater [3]	-------	-------	-------	-------	-------	1,010	1,105	-------	1,048	-------	-------	-------	3,163	−66.3	9,383
Rail [8]	133,723	106,964	63,802	69,004	90,346	141,520	109,964	129,376	119,293	119,159	96,780	81,632	1,261,563	−21.7	1,610,222
Exports [9]	469,442	305,466	363,360	362,198	310,386	466,411	288,910	449,279	476,577	329,344	239,990	270,422	4,331,785	−17.4	5,244,349
Imports [9]	-------	-------	-------	-------	-------	-------	-------	-------	-------	204	386	548	1,138	+2373.9	46
Industrial consumption and stocks:															
Railroads (Class I only): [3]															
Consumption	48,980	43,484	42,718	34,380	26,040	15,990	17,081	17,732	17,490	28,241	29,760	39,215	361,111	−11.8	409,494
Stocks	42,450	34,485	23,887	20,099	25,030	25,058	27,514	26,146	30,066	32,431	40,205	32,604	32,604	−23.6	42,669
Electric utilities: [10]															
Consumption	306,160	270,732	273,860	259,670	277,643	286,400	272,772	293,803	279,611	297,218	271,786	273,517	3,363,172	+2.0	3,295,916
Stocks	2,714,897	2,660,399	2,633,347	2,675,653	2,681,812	2,689,405	2,694,592	2,732,678	2,783,473	2,831,788	2,860,096	2,798,145	2,798,145	−.4	2,809,167
Stocks on Upper Lake docks: [7]															
Lake Superior	67,982	58,371	55,370	52,199	45,149	63,589	54,687	92,849	87,683	93,723	83,533	74,088	74,088	−9.6	81,990
Lake Michigan	39,311	30,342	29,796	43,248	41,507	46,514	41,454	44,651	48,671	41,808	37,309	34,841	34,841	−32.9	51,928
Producers' stocks [11]	264,191	287,595	364,651	384,596	323,422	280,883	307,563	394,336	516,318	532,109	510,494	499,620	499,620	+46.3	341,505
Stocks in retail dealer yards [12]	1,167,000	946,000	832,000	886,000	1,018,000	1,366,000	1,351,000	1,438,000	1,508,000	1,477,000	1,432,000	1,301,000	1,301,000	−13.2	1,498,000
Retail dealer deliveries [13]	1,746,000	1,190,000	946,000	695,000	623,000	746,000	723,000	759,000	697,000	855,000	721,000	969,000	10,670,000	−18.0	13,018,000

Wholesale price indexes (1947-49=100): [14]															
F. o. b. mines:															
Chestnut	136.7	136.7	136.7	120.0	120.0	120.0	123.2	123.8	127.6	131.9	132.5	136.2	128.8	+8.4	118.8
Pea	124.2	124.2	124.2	112.2	112.2	112.2	114.7	115.1	119.3	124.2	124.8	128.3	119.6	+10.3	108.4
Buckwheat No. 1	162.2	162.2	162.2	147.1	147.1	147.1	152.1	152.1	157.1	163.9	164.4	169.5	157.3	+13.2	138.9
Buckwheat No. 3	163.3	163.3	163.3	169.7	169.7	169.7	172.8	172.8	175.0	178.0	178.0	180.5	171.3	+16.3	147.3
Employee wages and hours: [14]															
Average weekly earnings	$93.19	$80.83	$73.41	$81.69	$77.78	$88.25	$81.72	$80.07	$92.22	$81.27	$76.85	$70.76	$81.79	+3.6	[15] $78.96
Average hourly earnings	$2.64	$2.65	$2.65	$2.61	$2.61	$2.65	$2.53	$2.66	$2.65	$2.63	$2.65	$2.66	$2.63	+9.6	[15] $2.40
Average number hours worked per week	35.3	30.5	27.7	31.3	29.8	33.3	32.3	30.1	34.8	30.9	29.0	26.6	31.1	−5.5	[15] 32.9

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[1] Furnished by Anthracite Institute.

[2] Pennsylvania Department of Mines.

[3] Association of American Railroads.

[4] Ore and Coal Exchange, Cleveland, Ohio.

[5] Buffalo Branch, Ore and Coal Exchange, Cleveland, Ohio.

[6] U. S. Engineer Office, Duluth, Minn.

[7] Includes all commercial docks on Lake Superior and west shore of Lake Michigan as far south as Kenosha. Based on data courteously supplied by Maher Coal Bureau and direct reports to the Bureau of Mines.

[8] Furnished by Commonwealth of Massachusetts, Division on the Necessaries of Life.

[9] U. S. Department of Commerce.

[10] Federal Power Commission.

[11] Anthracite Committee. Represents coal in ground storage on nearest available date to end of month.

[12] Estimated from reports submitted by a selected list of retail dealers.

[13] Estimated from reports submitted by a selected list of retail dealers. Does not include local sales.

[14] Bureau of Labor Statistics.

[15] Revised.

TABLE 3.—Statistical trends in the Pennsylvania anthracite industry, 1890–1957

Year	Production (net tons)	Value of production	Average value per net ton	Exports[1] (net tons)	Imports[1] (net tons)	Apparent consumption[2] (net tons)	Average number of employees	Average number of days worked	Average tons per man per day	Average tons per man per year	Quantity cut by machines[3] (net tons)	Quantity produced by stripping[4] (net tons)	Quantity loaded mechanically underground[5] (net tons)
1890	46,468,641	$66,383,772	$1.43	889,655	16,962	45,596,000	126,000	200	1.85	369			
1891	50,665,431	73,944,735	1.46	964,601	42,120	49,743,000	126,350	203	1.98	401			
1892	52,472,504	82,442,000	1.57	953,836	72,865	51,592,000	129,050	198	2.06	407			
1893	53,967,543	85,687,078	1.59	1,493,281	60,220	52,534,000	132,944	197	2.06	406			
1894	51,921,121	78,488,063	1.51	1,613,500	100,876	50,408,000	131,603	190	2.08	395			
1895	57,999,337	82,019,272	1.41	1,647,195	158,297	56,510,000	142,917	196	2.07	406			
1896	54,346,081	81,748,651	1.50	1,512,000	113,892	52,948,000	148,991	174	2.10	365			
1897	52,611,681	79,301,954	1.51	1,454,620	27,478	51,185,000	149,884	150	2.34	351			
1898	53,382,645	75,414,537	1.41	1,513,062	3,527	51,873,000	145,504	152	2.41	367			
1899	60,418,005	88,142,130	1.46	1,912,732	68	58,505,000	139,608	173	2.50	433			
1900	57,367,915	85,757,851	1.49	1,853,163	132	55,515,000	144,206	166	2.40	398			
1901	67,471,667	112,504,020	1.67	2,232,504	320	65,239,000	145,309	196	2.37	464			
1902	41,373,595	76,173,586	1.84	1,016,934	190,636	40,547,000	148,141	116	2.40	279			
1903	74,607,068	152,036,448	2.04	2,249,920	196,837	72,554,000	150,483	206	2.41	496			
1904	73,156,709	138,974,020	1.90	2,495,799	81,232	70,742,000	155,861	200	2.35	469			
1905	77,659,850	141,879,000	1.83	2,497,581	38,350	75,201,000	165,406	215	2.18	470			
1906	71,282,411	131,917,694	1.85	2,483,005	36,236	68,836,000	162,355	195	2.25	439			
1907	85,604,312	163,584,056	1.91	3,021,841	11,085	82,594,000	167,234	220	2.33	512			
1908	83,268,754	158,178,849	1.90	3,082,641	18,462	80,205,000	174,174	200	2.39	478			
1909	81,070,359	149,181,587	1.84	3,183,840	3,574	77,890,000	[6] 171,195	205	[7] 2.31	[7] 474			
1910	84,485,236	160,275,302	1.90	3,384,222	9,180	81,110,000	169,497	229	2.17	498			
1911	90,464,067	175,189,392	1.94	3,980,479	2,759	86,486,000	172,585	246	2.13	524	69,907		
1912	84,361,598	177,622,626	2.11	4,131,444	1,870	80,232,000	174,030	231	2.10	485	246,216		
1913	91,524,922	195,181,127	2.13	4,652,912	1,004	85,474,000	175,745	257	2.02	520	555,776		
1914	90,821,507	188,181,399	2.07	4,289,873	17,696	84,041,000	179,679	245	2.06	505	916,596		
1915	88,995,061	184,653,498	2.07	3,965,255	814	88,144,000	176,552	230	2.19	504	1,307,756	1,121,603	
1916	87,578,493	202,009,561	2.31	4,665,530	6,000	87,118,000	159,869	253	2.16	548	1,839,506	1,987,800	
1917	99,611,811	283,650,723	2.85	6,007,306	13,000	94,068,000	154,174	285	2.27	646	1,955,223	2,301,588	
1918	98,826,084	336,480,347	3.40	4,967,808	37,272	92,775,000	147,121	293	2.29	672	1,857,514	2,360,183	
1919	88,092,201	364,926,950	4.14	4,976,598	82,818	81,518,000	154,571	266	2.14	570	1,575,205	2,006,879	
1920	89,598,249	434,252,198	4.85	5,403,749	31,748	85,786,000	145,074	271	2.28	618	938,073	2,054,441	
1921	90,473,451	452,304,903	5.00	4,677,368	8,894	81,950,000	159,499	271	2.09	567	979,145	2,027,790	
1922	54,683,022	273,700,125	5.01	2,649,457	233,528	56,799,000	156,849	151	2.31	349	502,793	949,745	
1923	93,339,009	506,786,768	5.43	5,090,138	300,360	86,914,000	157,743	268	2.21	592	1,208,542	2,263,098	
1924	87,926,862	477,230,852	5.43	4,017,785	117,951	80,717,000	160,009	274	2.00	550	1,423,884	1,865,677	
1925	61,817,149	327,664,512	5.30	3,179,006	382,894	64,061,000	160,312	182	2.12	386	941,189	1,578,478	
1926	84,437,452	474,164,252	5.62	4,029,683	813,956	77,221,000	165,386	244	2.09	511	931,650	2,401,356	
1927	80,095,564	420,941,726	5.26	3,325,507	119,030	74,672,000	165,259	225	2.15	485	1,171,888	2,153,156	[6] 2,223,281
1928	75,348,069	393,637,690	5.22	3,336,272	384,707	73,650,000	160,681	217	2.17	469	1,289,809	2,422,924	[6] 2,351,074
1929	73,828,195	385,642,751	5.22	3,406,369	487,172	71,457,000	151,501	225	2.16	487	1,159,910	1,911,766	3,470,158

1930	69, 384, 837	354, 574, 191	5. 11	2, 551, 659	674, 812	67, 628, 000	150, 804	208	2. 21	460	1, 410, 123	2, 536, 288	4, 467, 750
1931	59, 645, 652	296, 354, 586	4. 97	1, 778, 308	637, 951	58, 408, 000	139, 431	181	2. 37	428	1, 587, 265	3, 813, 237	4, 384, 780
1932	49, 855, 221	222, 375, 129	4. 46	1, 303, 355	607, 097	50, 500, 000	121, 243	162	2. 54	411	1, 674, 223	3, 980, 973	5, 433, 340
1933	49, 541, 344	206, 718, 405	4. 17	1, 034, 562	456, 252	49, 600, 000	104, 633	182	2. 60	473	1, 648, 249	4, 932, 069	6, 557, 267
1934	57, 168, 291	244, 152, 245	4. 27	1, 297, 610	478, 118	55, 500, 000	109, 050	207	2. 53	524	1, 981, 088	5, 798, 138	9, 284, 486
1935	52, 158, 783	210, 130, 565	4. 03	1, 608, 549	571, 439	51, 100, 000	103, 269	189	2. 68	505	1, 848, 095	5, 187, 072	9, 279, 057
1936	54, 579, 535	227, 003, 538	4. 16	1, 678, 024	614, 639	53, 200, 000	102, 081	192	2. 79	535	2, 162, 744	6, 203, 267	10, 827, 946
1937	51, 856, 433	197, 598, 849	3. 81	1, 914, 173	395, 737	50, 400, 000	99, 085	189	2. 77	523	1, 984, 512	5, 696, 018	10, 683, 837
1938	46, 099, 027	180, 600, 167	3. 92	1, 908, 911	362, 895	45, 200, 000	96, 417	171	2. 79	478	1, 588, 407	5, 095, 341	10, 151, 669
1939	51, 487, 377	187, 175, 324	3. 64	2, 590, 000	298, 153	49, 700, 000	93, 138	183	3. 02	553	1, 881, 884	5, 486, 479	11, 773, 833
1940	51, 484, 640	205, 489, 814	3. 99	2, 667, 632	135, 436	49, 000, 000	91, 313	186	3. 02	562	1, 816, 483	6, 352, 700	12, 326, 000
1941	[8] 56, 368, 267	240, 275, 126	4. 26	3, 380, 189	74, 669	52, 700, 000	88, 054	203	[9] 3. 04	617	1, 855, 422	7, 316, 574	13, 441, 987
1942	[8] 60, 327, 729	271, 673, 380	4. 50	4, 438, 588	140, 115	56, 500, 000	82, 121	239	[9] 2. 95	705	2, 285, 640	9, 070, 933	14, 741, 459
1943	[8] 60, 643, 620	306, 816, 018	5. 06	4, 138, 680	166, 020	57, 100, 000	79, 153	270	[9] 2. 78	751	1, 624, 883	8, 989, 387	14, 745, 793
1944	[8] 63, 701, 363	354, 582, 884	5. 57	4, 185, 933	11, 847	59, 400, 000	77, 591	292	[9] 2. 79	815	1, 336, 082	10, 953, 030	14, 975, 146
1945	[8] 54, 933, 909	323, 944, 435	5. 90	3, 691, 247	149	51, 600, 000	72, 842	269	[9] 2. 79	751	1, 210, 171	10, 056, 325	13, 927, 955
1946	[8] 60, 506, 873	413, 417, 070	6. 83	6, 497, 245	9, 556	53, 900, 000	78, 145	271	[9] 2. 84	770	1, 232, 828	12, 858, 930	15, 619, 162
1947	[8] 57, 190, 009	413, 019, 486	7. 22	8, 509, 995	10, 350	48, 200, 000	78, 600	259	[9] 2. 78	720	1, 209, 983	12, 603, 545	16, 054. 011
1948	[8] 57, 139, 948	467, 051, 800	8. 17	6, 675, 914	945	50, 200, 000	76, 215	265	[9] 2. 81	745	1, 016, 757	13, 352, 874	15, 742, 368
1949	[8] 42, 701, 724	358, 008, 451	8. 38	4, 942, 670	----------	37, 700, 000	75, 377	195	[9] 2. 87	560	557, 599	10, 376, 808	11, 858, 088
1950	[8] 44, 076, 703	392, 398, 006	8. 90	3, 891, 569	18, 289	39, 900, 000	72, 624	211	[9] 2. 83	597	611, 734	11, 833, 934	12, 335, 650
1951 [10]	42, 669, 997	405, 817, 963	9. 51	5, 955, 535	26, 812	37, 000, 000	68, 995	208	2. 97	618	496, 085	11, 135, 990	10, 847, 787
1952	40, 582, 558	379, 714, 076	9. 36	4, 592, 060	29, 370	35, 300, 000	65, 923	201	3. 06	615	386, 128	10, 696, 705	10, 034, 464
1953	30, 949, 152	299, 139, 687	9. 67	2, 724, 270	31, 443	28, 000, 000	57, 862	163	3. 28	535	318, 699	8, 606, 482	6, 838, 769
1954	29, 083, 477	247, 870, 023	8. 52	2, 851, 239	5, 831	26, 900, 000	43, 996	164	4. 02	659	381, 424	7, 939, 680	6, 978, 035
1955	26, 204, 554	206, 096, 662	7. 86	3, 152, 313	170	23, 600, 000	[11] 33, 523	[11] 197	[11] 3. 96	[11] 780	393, 932	7, 703, 907	6, 660, 939
1956	28, 900, 220	236, 785, 062	8. 19	5, 244, 349	46	24, 000, 000	31, 516	216	4. 25	918	400, 402	8, 354, 230	7, 308, 110
1957	25, 338, 321	227, 753, 802	8. 99	4, 331, 785	1, 138	20, 800, 000	30, 825	196	4. 18	819	292, 307	7, 543, 157	6, 657, 479

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[1] U. S. Department of Commerce.

[2] Before 1913 the figures of consumption take no account of producers' stocks, there being no data available for this item.

[3] Data first collected in 1911.

[4] Data first collected in 1915.

[5] Data first collected in 1929.

[6] As reported by the Commonwealth of Pennsylvania, Department of Mines.

[7] Calculated on basis of Pennsylvania Department of Mines employment data.

[8] Includes some "bootleg" coal purchased by authorized operators and prepared at their breakers.

[9] Output per man calculated on authorized tonnages only; bootleg purchases excluded.

[10] Figures for 1951 and subsequent years are not strictly comparable with previous years. See Production and Employment sections, Coal—Pennsylvania Anthracite, Minerals Yearbook, 1951.

[11] Estimated.

Production declined from each source in 1957 as follows: From underground mines, 16 percent; strip mines, 10 percent; culm banks, 5 percent; and dredges, 8 percent. The greater decline in activity at deep mines continued the trend of recent years, and underground coal represented 50 percent of the total output compared with 52 percent in 1956. The proportions of output from strip mines and culm banks increased slightly, but that from river dredging remained the same as in 1956. Trends in production from the various sources are shown in figure 4.

The average number of men working at anthracite operations declined 2 percent to 30,825 in 1957 owing probably to further concentration of output by the shutting down of some large mines. Reflecting the reduced production activity, the industry operated an average of 196 days compared with 216 days in 1956. Productivity of labor at anthracite mines in 1957 was 4.18 tons per man-day—a slight recession from the record of 4.25 tons established in 1956. In keeping with the reduction in working force, labor-turnover rates showed lower accessions and higher separations in 1957. According to the Bureau of Labor Statistics, the accession rate was 1.3 and the separation rate 2.4 per 100 employees, compared with 1.4 and 1.5, respectively, for 1956. As a result of the increased rates of pay established by the wage agreement of December 1, 1956, the average hourly earnings of anthracite workers advanced 23 cents to $2.63 in 1957. Other major benefits for labor in the new wage agreement were increased vacation pay (from $100 to $140) and higher premium pay for Saturday, Sunday, and holiday work.

The overall injury experience of the industry improved in 1957, and the frequency of all injuries (fatal and nonfatal) decreased to 66.08 per million man-hours of work compared with 67.42 for 1956. There were 51 fatalities in 1957, or 5 less than in 1956. Likewise, there was a substantial reduction of 453 nonfatal injuries to a total of 2,877 for 1957. Details of the injury record for anthracite mines are given in the chapter, Employment and Injuries in the Fuel Industries, of this volume.

SCOPE OF REPORT

The anthracite-producing area of Pennsylvania (frequently referred to as "the region" or the "local sales" area) is divided into three regions—the Wyoming, Lehigh, and Schuylkill. Geologically, the coal measures are divided into four producing fields: The Northern (the coal deposits of which underlie a surface area of 176 square miles), the Eastern Middle (33 square miles), the Western Middle (94 square miles), and the Southern (181 square miles). As the anthracite region encompasses part or all of 10 counties in the northeastern part of the State, certain data are presented by counties as well as by regions and fields to meet the needs of individual readers. A further general breakdown provides information by source (strip, culm bank, dredge, and underground). Although data on the production of semianthracite, such as occurs in parts of Arkansas, Colorado, New Mexico, Virginia, and Washington, are combined with those on bituminous coal and lignite, a small quantity of semianthracite produced in Sullivan County, Pa., is included in Bureau data on the Pennsylvania anthracite industry because of the county's proximity to the Northern field.

Pennsylvania anthracite is produced at underground mines, strip pits, and culm banks and by dredges operating in creeks and rivers that traverse the anthracite fields. Except where noted, the production data in this chapter represent the cleaned and sized output of coal from preparation plants and dredges. In addition to the reports submitted annually by preparation plants, producers of run-of-mine material are also canvassed for information on the quantity of raw coal produced, the names of preparation plants to which the run-of-mine, strip, or bank material was sold or transferred for preparation, and the number and types of mechanical equipment used, as well as for other data related to the mining or recovery cycle. Reports submitted by producers are checked against those of preparation plants not only to insure accuracy of reporting and adequacy of coverage but to allocate output to the county, field, and region in which it was produced, since the run-of-mine material frequently crosses such boundary lines in reaching preparation plants.

The procedure outlined results in virtually complete coverage of total annual production. The remaining tonnage, or other pertinent data on which the Bureau has not received adequate reports, is estimated on the basis of collateral data released by the Anthracite Committee and the Pennsylvania Department of Mines and Mineral Industries.

Each preparation plant (including dredges) is requested to include in its report of production all coal produced and shipped into, but not out of, storage. The anthracite-originating railroads follow the same procedure in reporting carloadings to the Association of American Railroads. The association provides these carloading data to the Bureau for use in preparing weeky and monthly estimates of production.

The employment data in this chapter are compiled from the Bureau of Mines questionnaire, Mine Injuries and Employment—Pennsylvania Anthracite, whereas for 1954 and prior years the data were collected in conjunction with the regular production canvasses. However, the overall coverage has not changed, since identical mailing lists are used to obtain information on injuries and employment and on production. Moreover, the totals on employment, as in years past, include only production, development, maintenance, repair, supervisory and technical personnel, and those proprietors or firm members actually performing work at the operation. Members of clerical and office staffs, sales agencies, and personnel of affiliated industries not actively engaged in the production of anthracite are excluded.

The methods used in collecting and processing Bureau data on the distribution of Pennsylvania anthracite are described in the Distribution section of this chapter. The short, or net, ton (2,000 pounds) is used throughout this chapter.

ACKNOWLEDGMENTS

To present wide statistical coverage of the Pennsylvania anthracite industry, it is necessary to assemble information from a large number of sources. Besides several agencies of the Federal Government, special thanks are due to the Pennsylvania Department of Mines and Mineral Industries, the Anthracite Committee, the Anthracite

Institute, the Association of American Railroads, the Commonwealth of Massachusetts, the Ore and Coal Exchange, Saward's Journal, and others too numerous to record. For the great detail in which it has been possible to present the production data in this chapter, the Bureau of Mines is indebted to the producing companies that for many years have cooperated voluntarily and wholeheartedly with the Bureau's entire statistical program.

The production data for 1957 were collected, edited, and tabulated by Ruth A. Cooper, Kathryn S. Huling, and Elizabeth M. Battease under the direction of C. S. Kuebler, director, Bureau of Mines Anthracite Experiment Station, Schuylkill Haven, Pa.

PRODUCTION, MINING METHODS, AND EQUIPMENT

As a result of decreased demand in American, Canadian, and overseas markets, the production of Pennsylvania anthracite dropped to 25.3 million tons in 1957—12 percent under the total for 1956. Warmer-than-normal weather in major American and Canadian anthracite-marketing areas and continued strong competition from other fuels resulted in decreased demand for the larger, or space-heating, sizes. Large stocks of anthracite depressed the market in Western Europe.

Over the past few years demand for the smaller sizes of anthracite has been relatively stronger than for the larger coals. Although anthracite suffered severe tonnage losses for space heating, use of the smaller sizes remained comparatively stable, or showed actual gains, for such industrial purposes as boiler fuel at public utility plants, as an admix with bituminous coal in cokemaking, and in sintering and pelletizing iron-ore fines. Consequently, the finer sizes steadily increased their share of total production and, in 1957, Buckwheat No. 2 (Rice) and smaller sizes composed 44 percent of the year's total shipments. The disparity between the demand for the smaller and larger coals is indicated by the fact that, while total output fell 12 percent from 1956 to 1957, the output of Buckwheat No. 1 and larger sizes (most commonly used for residential heating) declined 18 percent, yet the production of Buckwheat No. 2 (Rice) and smaller decreased only 4 percent.

Of the total 1957 output, 17 percent was produced in the Lehigh, 37 percent in the Wyoming, and 46 percent in the Schuylkill region. These data represented declines from 1956 of 8, 16, and 10 percent, respectively. Changes in the percentages of output from the several regions and fields are shown in figure 2. The only county to report an increase was Columbia; each of the others (excluding counties producing dredge coal only) had declines ranging from 51 percent in Carbon to 6 percent in Northumberland and Schuylkill. The abrupt decrease in the output of Carbon County resulted primarily from cessation of mining at some major underground mines in the Panther Valley.

Detailed data on production by fields, regions, and counties of origin are shown in tables 4 to 9, while total shipments of anthracite, by sizes, expressed in percent of total, are shown in tables 10 to 12. Figure 3 graphically illustrates trends in shipments by regions, 1935–57.

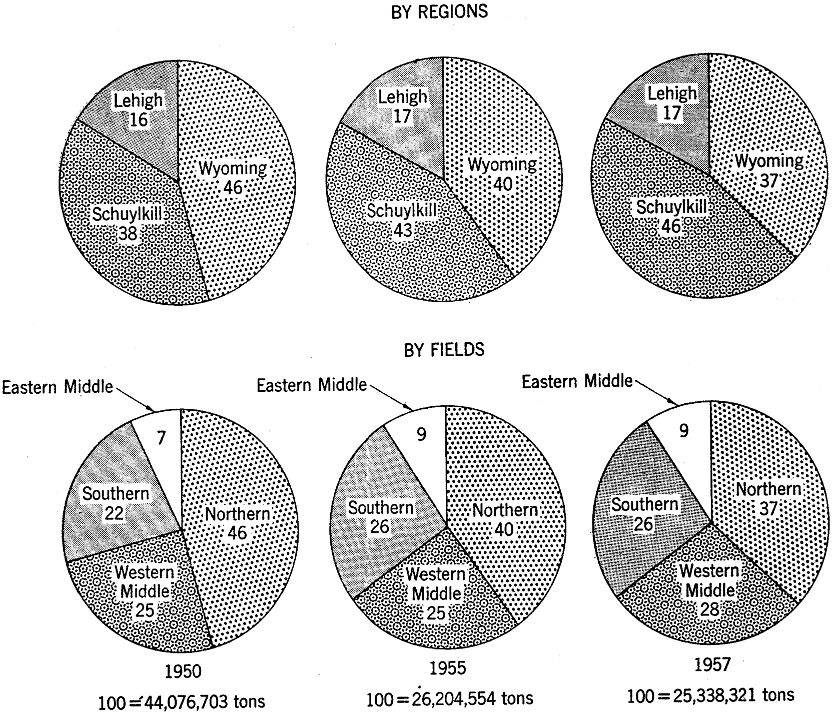

FIGURE 2.—Percentage of total production of Pennsylvania anthracite, 1950, 1955, and 1957, by regions and fields.

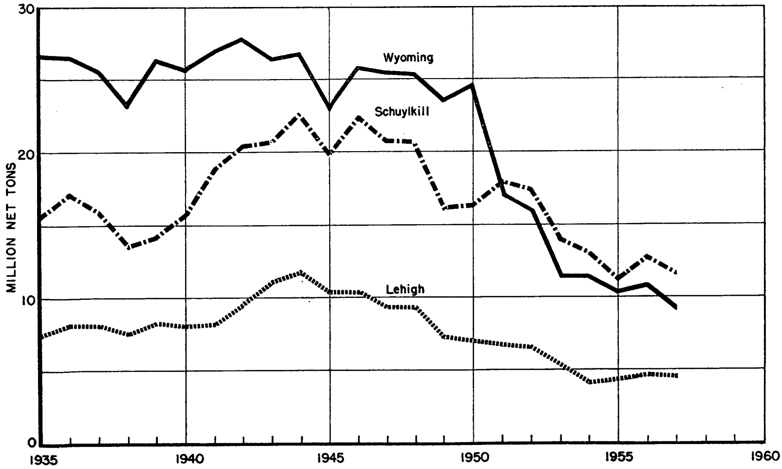

FIGURE 3.—Pennsylvania anthracite shipped from the Lehigh, Schuylkill, and Wyoming regions, 1935–57.

TABLE 4.—Pennsylvania anthracite produced, 1953–57, by fields, in net tons

Field	1953	1954	1955	1956	1957
Eastern Middle:					
Breakers and washeries	2, 541, 375	2, 514, 873	2, 409, 794	2, 391, 906	2, 404, 609
Western Middle:					
Breakers and washeries	8, 882, 129	7, 911, 794	6, 527, 929	7, 268, 150	6, 930, 428
Dredges	46, 884	83, 547	52, 169	46, 348	38, 497
Total Western Middle	8, 929, 013	7, 995, 341	6, 580, 098	7, 314, 498	6, 968, 925
Southern:					
Breakers and washeries	7, 352, 970	5, 952, 615	5, 958, 776	7, 425, 427	6, 061, 879
Dredges	380, 339	635, 371	712, 724	625, 310	594, 941
Total Southern	7, 733, 309	6, 587, 986	6, 671, 500	8, 050, 737	6, 656, 820
Northern:					
Breakers and washeries	11, 717, 270	11, 961, 914	10, 509, 309	11, 091, 748	9, 278, 845
Dredges	10, 958	6, 989	23, 950	44, 629	24, 263
Total Northern	11, 728, 228	11, 968, 903	10, 533, 259	11, 136, 377	9, 303, 108
Total, excluding Sullivan County:					
Breakers and washeries	30, 493, 744	28, 341, 196	25, 405, 808	28, 177, 231	24, 675, 761
Dredges	438, 181	725, 907	788, 843	716, 287	657, 701
Total, excluding Sullivan County	30, 931, 925	29, 067, 103	26, 194, 651	28, 893, 518	25, 333, 462
Sullivan County: [1] Breakers	17, 227	16, 374	9, 903	6, 702	4, 859
Grand total	30, 949, 152	29, 083, 477	26, 204, 554	28, 900, 220	25, 338, 321

[1] For purposes of historical comparison and statistical convenience, the mines of Sullivan County are grouped with the Pennsylvania anthracite region, although the product is classified as semianthracite, according to the American Society for Testing Materials Tentative Standard.

TABLE 5.—Pennsylvania anthracite shipped outside producing region, sold locally, and used as colliery fuel in 1957, by regions

Region	Shipments outside region		Local sales		Colliery fuel		Total	
	Net tons	Value [1]	Net tons	Value	Net tons	Value	Net tons	Value [1]
Lehigh:								
Breakers and washeries	4, 052, 414	$32, 810, 212	336, 446	$3, 926, 475	44, 804	$331, 917	4, 433, 664	$37, 068, 604
Dredges	30, 650	114, 658	----	----	----	----	30, 650	114, 658
Total Lehigh	4, 083, 064	32, 924, 870	336, 446	3, 926, 475	44, 804	331, 917	4, 464, 314	37, 183, 262
Schuylkill:								
Breakers and washeries	9, 169, 357	78, 145, 946	1, 755, 322	16, 150, 619	38, 573	280, 558	10, 963, 252	94, 577, 123
Dredges	575, 324	853, 676	26, 939	100, 979	525	1, 050	602, 788	955, 705
Total Schuylkill	9, 744, 681	78, 999, 622	1, 782, 261	16, 251, 598	39, 098	281, 608	11, 566, 040	95, 532, 828
Wyoming:								
Breakers and washeries	7, 132, 549	74, 530, 534	1, 950, 944	19, 276, 297	195, 352	1, 113, 503	9, 278, 845	94, 920, 334
Dredges	24, 263	72, 789	----	----	----	----	24, 263	72, 789
Total Wyoming	7, 156, 812	74, 603, 323	1, 950, 944	19, 276, 297	195, 352	1, 113, 503	9, 303, 108	94, 993, 123
Total, excluding Sullivan County:								
Breakers and washeries	20, 354, 320	185, 486, 692	4, 042, 712	39, 353, 391	278, 729	1, 725, 978	24, 675, 761	226, 566, 061
Dredges	630, 237	1, 041, 123	26, 939	100, 979	525	1, 050	657, 701	1, 143, 152
Total	20, 984, 557	186, 527, 815	4, 069, 651	39, 454, 370	279, 254	1, 727, 028	25, 333, 462	227, 709, 213
Sullivan County: Breakers	1, 094	9, 734	3, 755	34, 745	10	110	4, 859	44, 589
Grand total:								
1957	20, 985, 651	186, 537, 549	4, 073, 406	39, 489, 115	279, 264	1, 727, 138	25, 338, 321	227, 753, 802
1956	24, 270, 068	197, 512, 677	4, 288, 532	37, 486, 892	341, 620	1, 785, 493	28, 900, 220	236, 785, 062
Change, percent	−13. 5	−5. 6	−5. 0	+5. 3	−18. 3	−3. 3	−12. 3	−3. 8

[1] Value given for shipments is value at which coal left possession of producing company; does not include margins of separately incorporated sales companies.

TABLE 6.—Pennsylvania anthracite produced in 1957, classified as fresh-mined, culm-bank, and river coal, by regions, in net tons

Region	From mines			From culm banks	From river dredging	Total
	Underground		Strip pits			
	Mechanically loaded	Hand loaded				
Lehigh	208,345	1,143,410	1,624,040	1,457,869	30,650	4,464,314
Schuylkill	778,177	3,805,227	3,900,607	2,479,241	602,788	11,566,040
Wyoming	5,670,957	1,009,937	2,013,651	584,300	24,263	9,303,108
Total, excluding Sullivan County	6,657,479	5,958,574	7,538,298	4,521,410	657,701	25,333,462
Sullivan County	----------	----------	4,859	----------	----------	4,859
Grand total	6,657,479	5,958,574	7,543,157	4,521,410	657,701	25,338,321

TABLE 7.—Pennsylvania anthracite produced in 1957, classified as fresh-mined, culm-bank, and river coal, by fields, in net tons

Field	From mines			From culm banks	From river dredging	Total
	Underground		Strip pits			
	Mechanically loaded	Hand loaded				
Eastern Middle	166,216	97,053	929,808	1,211,532	----------	2,404,609
Western Middle	425,829	2,326,210	2,572,374	1,606,015	38,497	6,968,925
Southern	394,477	2,525,374	2,022,465	1,119,563	594,941	6,656,820
Northern	5,670,957	1,009,937	2,013,651	584,300	24,263	9,303,108
Total, excluding Sullivan County	6,657,479	5,958,574	7,538,298	4,521,410	657,701	25,333,462
Sullivan County	----------	----------	4,859	----------	----------	4,859
Grand total	6,657,479	5,958,574	7,543,157	4,521,410	657,701	25,338,321

Underground Mines.—Continuing the trend of recent years (see table 21) production of anthracite at underground mines declined sharply in 1957, falling 16 percent below 1956. As the overall decline in production was 12 percent, the proportionately greater decrease in the output of underground coal again highlighted efforts of the industry to effect economies by closing down, or curtailing activities at, deep mines while obtaining relatively greater quantities of coal from strip pits and culm and silt banks. Figure 4 illustrates the trends in production of anthracite by sources, 1948–57. The practice of pur-

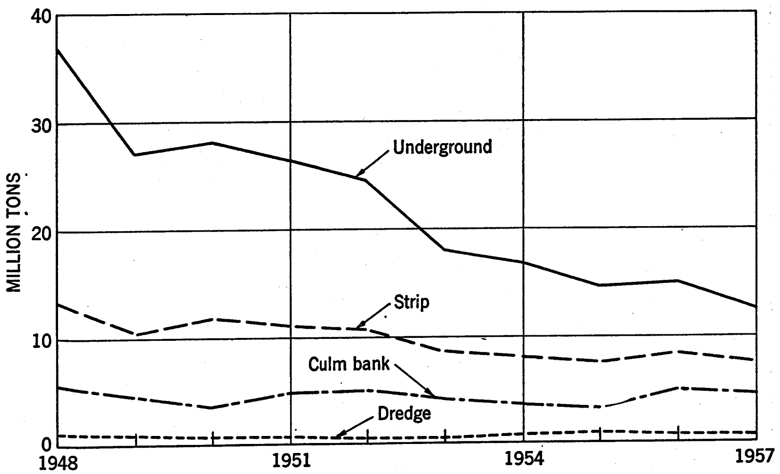

FIGURE 4.—Production of Pennsylvania anthracite, by sources, 1948–57.

chasing large tonnages of run-of-mine coal from small underground operators continued in 1957. The growth of these small producers has been particularly rapid in the Schuylkill region, where mining conditions are more favorable for small operators. Of the 12.6 million tons produced underground, 36 percent was produced in the Schuylkill region—a gain of 2 points—while the Wyoming region dropped from 55 percent of the 1956 underground total to 53 percent and the Lehigh remained stationary at 11 percent in both years. Compared with 1956, underground production in the Schuylkill region declined only 11 percent, whereas in the Wyoming and Lehigh regions the decreases were 19 and 18 percent, respectively. Detailed data on the production of anthracite by field, region, and type of mining are presented in tables 6 and 7.

Strip Pits.—The production of anthracite from strip pits in 1957 totaled 7.5 million tons—a decrease of approximately 800,000 tons. However, because of the sharp break in underground production, output from strip pits increased from 29 percent of total production in 1956 to 30 percent—the same as in 1955. By regions, the tonnage produced at strip mines declined 13 percent in the Wyoming, 2 percent in the Lehigh, and 11 percent in the Schuylkill region. Of the fresh-mined coal produced in 1957, 55 percent of the Lehigh region's total was stripped compared with 50 percent in 1956; 46 percent of the Schuylkill's, the same percentage in 1956; and 23 percent of the Wyoming's (22 percent in 1956). Despite the absolute tonnage loss, the proportionate gains in the Lehigh and Wyoming regions are due to the fact that they suffered a relatively greater loss in underground production than the Schuylkill region.

TABLE 8.—Pennsylvania anthracite shipped in 1957, by regions and sizes

Size	From breakers and washeries								
	Lehigh region			Schuylkill region			Wyoming region		
	Outside region	Local sales	Total	Outside region	Local sales	Total	Outside region	Local sales	Total
NET TONS									
Lump [1] and Broken	477	----------	477	41,266	740	42,006	8,908	19,001	27,909
Egg	36,508	1,503	38,011	61,297	1,700	62,997	105,886	2,465	108,351
Stove	435,397	8,487	443,884	1,157,934	179,645	1,337,579	1,568,585	46,250	1,614,835
Chestnut	551,319	53,041	604,360	1,379,320	352,288	1,731,608	1,923,826	233,672	2,157,498
Pea	332,953	98,163	431,116	782,269	298,290	1,080,559	693,710	606,300	1,300,010
Total Pea and larger	1,356,654	161,194	1,517,848	3,422,086	832,663	4,254,749	4,300,915	907,688	5,208,603
Buckwheat No. 1	380,674	55,071	435,745	1,092,702	260,876	1,353,578	899,771	375,729	1,275,500
Buckwheat No. 2 (Rice)	248,478	91,664	340,142	781,300	226,949	1,008,249	561,786	229,205	790,991
Buckwheat No. 3 (Barley)	350,558	24,925	375,483	1,304,863	254,767	1,559,630	716,685	187,531	904,216
Buckwheat No. 4	363,981	621	364,602	705,933	68,334	774,267	182,229	5,202	187,431
Buckwheat No. 5	458,546	2,971	461,517	911,532	30,535	942,067	79,565	106,011	185,576
Other [2]	893,523	----------	893,523	950,941	81,198	1,032,139	391,598	139,578	531,176
Total Buckwheat No. 1 and smaller	2,695,760	175,252	2,871,012	5,747,271	922,659	6,669,930	2,831,634	1,043,256	3,874,890
Grand total	4,052,414	336,446	4,388,860	9,169,357	1,755,322	10,924,679	7,132,549	1,950,944	9,083,493
VALUE									
Lump [1] and Broken	$6,734	----------	$6,734	$605,422	$10,018	$615,440	$114,735	$247,353	$362,088
Egg	478,999	$18,786	497,785	813,932	22,294	836,226	1,305,795	31,782	1,337,577
Stove	5,893,853	114,153	6,008,006	14,832,625	2,249,076	17,081,701	20,342,124	656,293	20,998,417
Chestnut	7,476,655	800,775	8,277,430	17,679,898	4,404,617	22,084,515	25,178,560	3,374,110	28,552,670
Pea	3,459,806	1,249,032	4,708,838	8,102,191	3,123,158	11,225,349	7,229,688	7,122,371	14,352,059
Total Pea and larger	17,316,047	2,182,746	19,498,793	42,034,068	9,809,163	51,843,231	54,170,902	11,431,909	65,602,811
Buckwheat No. 1	3,626,690	617,050	4,243,740	9,977,207	2,334,184	12,311,391	8,250,117	3,852,711	12,102,828
Buckwheat No. 2 (Rice)	2,111,506	921,924	3,033,430	6,463,111	1,831,545	8,294,656	4,730,650	2,046,972	6,777,622
Buckwheat No. 3 (Barley)	2,272,019	189,500	2,461,519	8,327,814	1,508,698	9,836,512	4,513,821	1,189,673	5,703,494
Buckwheat No. 4	1,847,989	3,876	1,851,865	3,393,289	284,236	3,677,525	906,499	22,574	929,073

Buckwheat No. 5	2, 209, 785	11, 379	2, 221, 164	4, 327, 985	106, 113	4, 434, 098	317, 138	406, 842	723, 980
Other [2]	3, 426, 176		3, 426, 176	3, 622, 472	276, 680	3, 899, 152	1, 641, 407	325, 616	1, 967, 023
Total Buckwheat No. 1 and smaller	15, 494, 165	1, 743, 729	17, 237, 894	36, 111, 878	6, 341, 456	42, 453, 334	20, 359, 632	7, 844, 388	28, 204, 020
Grand total	32, 810, 212	3, 926, 475	36, 736, 687	78, 145, 946	16, 150, 619	94, 296, 565	74, 530, 534	19, 276, 297	93, 806, 831
AVERAGE VALUE PER TON									
Lump [1] and Broken	$14. 12		$14. 12	$14. 67	$13. 54	$14. 65	$12. 88	$13. 02	$12. 97
Egg	13. 12	$12. 50	13. 10	13. 28	13. 11	13. 27	12. 33	12. 89	12. 34
Stove	13. 54	13. 45	13. 54	12. 81	12. 52	12. 77	12. 97	14. 19	13. 00
Chestnut	13. 56	15. 10	13. 70	12. 82	12. 50	12. 75	13. 09	14. 44	13. 23
Pea	10. 39	12. 72	10. 92	10. 36	10. 47	10. 39	10. 42	11. 75	11. 04
Total Pea and larger	12. 76	13. 54	12. 85	12. 28	11. 78	12. 18	12. 60	12. 59	12. 60
Buckwheat No. 1	9. 53	11. 20	9. 74	9. 13	8. 95	9. 10	9. 17	10. 25	9. 49
Buckwheat No. 2 (Rice)	8. 50	10. 06	8. 92	8. 27	8. 07	8. 23	8. 42	8. 93	8. 57
Buckwheat No. 3 (Barley)	6. 48	7. 60	6. 56	6. 38	5. 92	6. 31	6. 30	6. 34	6. 31
Buckwheat No. 4	5. 08	6. 24	5. 08	4. 81	4. 16	4. 75	4. 97	4. 34	4. 96
Buckwheat No. 5	4. 82	3. 83	4. 81	4. 75	3. 48	4. 71	3. 99	3. 84	3. 90
Other [2]	3. 83		3. 83	3. 81	3. 41	3. 78	4. 19	2. 33	3. 70
Total Buckwheat No. 1 and smaller	5. 75	9. 95	6. 00	6. 28	6. 87	6. 36	7. 19	7. 52	7. 28
Grand total	8. 10	11. 67	8. 37	8. 52	9. 20	8. 63	10. 45	9. 88	10. 33

See footnotes at end of table.

TABLE 8.—Pennsylvania anthracite shipped in 1957, by regions and sizes—Continued

Size	From breakers and washeries—(Continued)								
	Sullivan County			Total					
				Excluding Sullivan County			Including Sullivan County		
	Outside region	Local sales	Total	Outside region	Local sales	Total	Outside region	Local sales	Total
NET TONS									
Lump [1] and Broken				50, 651	19, 741	70, 392	50, 651	19, 741	70, 392
Egg				203, 691	5, 668	209, 359	203, 691	5, 668	209, 359
Stove				3, 161, 916	234, 382	3, 396, 298	3, 161, 916	234, 382	3, 396, 298
Chestnut	294	1, 429	1, 723	3, 854, 465	639, 001	4, 493, 466	3, 854, 759	640, 430	4, 495, 189
Pea	300	948	1, 248	1, 808, 932	1, 002, 753	2, 811, 685	1, 809, 232	1, 003, 701	2, 812, 933
Total Pea and larger	594	2, 377	2, 971	9, 079, 655	1, 901, 545	10, 981, 200	9, 080, 249	1, 903, 922	10, 984, 171
Buckwheat No. 1				2, 373, 147	691, 676	3, 064, 823	2, 373, 147	691, 676	3, 064, 823
Buckwheat No. 2 (Rice)	500	1, 378	1, 878	1, 591, 564	547, 818	2, 139, 382	1, 592, 064	549, 196	2, 141, 260
Buckwheat No. 3 (Barley)				2, 372, 106	467, 223	2, 839, 329	2, 372, 106	467, 223	2, 839, 329
Buckwheat No. 4				1, 252, 143	74, 157	1, 326, 300	1, 252, 143	74, 157	1, 326, 300
Buckwheat No. 5				1, 449, 643	139, 517	1, 589, 160	1, 449, 643	139, 517	1, 589, 160
Other [2]				2, 236, 062	220, 776	2, 456, 838	2, 236, 062	220, 776	2, 456, 838
Total Buckwheat No. 1 and smaller	500	1, 378	1, 878	11, 274, 665	2, 141, 167	13, 415, 832	11, 275, 165	2, 142, 545	13, 417, 710
Grand total	1, 094	3, 755	4, 849	20, 354, 320	4, 042, 712	24, 397, 032	20, 355, 414	4, 046, 467	24, 401, 881
VALUE									
Lump [1] and Broken				$726, 891	$257, 371	$984, 262	$726, 891	$257, 371	$984, 262
Egg				2, 598, 726	72, 862	2, 671, 588	2, 598, 726	72, 862	2, 671, 588
Stove				41, 068, 602	3, 019, 522	44, 088, 124	41, 068, 602	3, 019, 522	44, 088, 124
Chestnut	$3, 234	$15, 619	$18, 853	50, 335, 113	8, 579, 502	58, 914, 615	50, 338, 347	8, 595, 121	58, 933, 468
Pea	3, 000	9, 480	12, 480	18, 791, 685	11, 494, 561	30, 286, 246	18, 794, 685	11, 504, 041	30, 298, 726
Total Pea and larger	6, 234	25, 099	31, 333	113, 521, 017	23, 423, 818	136, 944, 835	113, 527, 251	23, 448, 917	136, 976, 168
Buckwheat No. 1				21, 854, 014	6, 803, 945	28, 657, 959	21, 854, 014	6, 803, 945	28, 657, 959
Buckwheat No. 2 (Rice)	3, 500	9, 646	13, 146	13, 305, 267	4, 800, 441	18, 105, 708	13, 308, 767	4, 810, 087	18, 118, 854
Buckwheat No. 3 (Barley)				15, 113, 654	2, 887, 871	18, 001, 525	15, 113, 654	2, 887, 871	18, 001, 525
Buckwheat No. 4				6, 147, 777	310, 686	6, 458, 463	6, 147, 777	310, 686	6, 458, 463

Buckwheat No. 5				6, 854, 908	524, 334	7, 379, 242	6, 854, 908	524, 334	7, 379, 242
Other [2]				8, 690, 055	602, 296	9, 292, 351	8, 690, 055	602, 296	9, 292, 351
Total Buckwheat No. 1 and smaller	3, 500	9, 646	13, 146	71, 965, 675	15, 929, 573	87, 895, 248	71, 969, 175	15, 939, 219	87, 908, 394
Grand total	9, 734	34, 745	44, 479	185, 486, 692	39, 353, 391	224, 840, 083	185, 496, 426	39, 388, 136	224, 884, 562
AVERAGE VALUE PER TON									
Lump [1] and Broken				$14. 35	$13. 04	$13. 98	$14. 35	$13. 04	$13. 98
Egg				12. 76	12. 85	12. 76	12. 76	12. 85	12. 76
Stove				12. 99	12. 88	12. 98	12. 99	12. 88	12. 98
Chestnut	$11. 00	$10. 93	$10. 94	13. 06	13. 43	13. 11	13. 06	13. 42	13. 11
Pea	10. 00	10. 00	10. 00	10. 39	11. 46	10. 77	10. 39	11. 46	10. 77
Total Pea and larger	10. 49	10. 56	10. 55	12. 50	12. 32	12. 47	12. 50	12. 32	12. 47
Buckwheat No. 1				9. 21	9. 84	9. 35	9. 21	9. 84	9. 35
Buckwheat No. 2 (Rice)	7. 00	7. 00	7. 00	8. 36	8. 76	8. 46	8. 36	8. 76	8. 46
Buckwheat No. 3 (Barley)				6. 37	6. 18	6. 34	6. 37	6. 18	6. 34
Buckwheat No. 4				4. 91	4. 19	4. 87	4. 91	4. 19	4. 87
Buckwheat No. 5				4. 73	3. 76	4. 64	4. 73	3. 76	4. 64
Other [2]				3. 89	2. 73	3. 78	3. 89	2. 73	3. 78
Total Buckwheat No. 1 and smaller	7. 00	7. 00	7. 00	6. 38	7. 44	6. 55	6. 38	7. 44	6. 55
Grand total	8. 90	9. 25	9. 17	9. 11	9. 73	9. 22	9. 11	9. 73	9. 22

See footnotes at end of table.

TABLE 8.—Pennsylvania anthracite shipped in 1957, by regions and sizes—Con.

Size	From river dredging			Grand total		
	Outside region	Local sales	Total	Outside region	Local sales	Total
NET TONS						
Lump[1] and Broken	-----	-----	-----	50, 651	19, 741	70, 392
Egg	-----	-----	-----	203, 691	5, 668	209, 359
Stove	-----	-----	-----	3, 161, 916	234, 382	3, 396, 298
Chestnut	-----	-----	-----	3, 854, 759	640, 430	4, 495, 189
Pea	178	260	438	1, 809, 410	1, 003, 961	2, 813, 371
Total Pea and larger	178	260	438	9, 080, 427	1, 904, 182	10, 984, 609
Buckwheat No. 1	50	335	385	2, 373, 197	692, 011	3, 065, 208
Buckwheat No. 2 (Rice)	-----	500	500	1, 592, 064	549, 696	2, 141, 760
Buckwheat No. 3 (Barley)	9, 522	519	10, 041	2, 381, 628	467, 742	2, 849, 370
Buckwheat No. 4	36, 890	4, 955	41, 845	1, 289, 033	79, 112	1, 368, 145
Buckwheat No. 5	24, 568	9, 758	34, 326	1, 474, 211	149, 275	1, 623, 486
Other[2]	559, 029	10, 612	569, 641	2, 795, 091	231, 388	3, 026, 479
Total Buckwheat No. 1 and smaller	630, 059	26, 679	656, 738	11, 905, 224	2, 169, 224	14, 074, 448
Grand total	630, 237	26, 939	657, 176	20, 985, 651	4, 073, 406	25, 059, 057
VALUE						
Lump[1] and Broken	-----	-----	-----	$726, 891	$257, 371	$984, 262
Egg	-----	-----	-----	2, 598, 726	72, 862	2, 671, 588
Stove	-----	-----	-----	41, 068, 602	3, 019, 522	44, 088, 124
Chestnut	-----	-----	-----	50, 338, 347	8, 595, 121	58, 933, 468
Pea	$968	$1, 740	$2, 708	18, 795, 653	11, 505, 781	30, 301, 434
Total Pea and larger	968	1, 740	2, 708	113, 528, 219	23, 450, 657	136, 978, 876
Buckwheat No. 1	150	2, 010	2, 160	21, 854, 164	6, 805, 955	28, 660, 119
Buckwheat No. 2 (Rice)	-----	2, 750	2, 750	13, 308, 767	4, 812, 837	18, 121, 604
Buckwheat No. 3 (Barley)	31, 710	3, 197	34, 907	15, 145, 364	2, 891, 068	18, 036, 432
Buckwheat No. 4	127, 181	18, 232	145, 413	6, 274, 958	328, 918	6, 603, 876
Buckwheat No. 5	96, 687	29, 538	126, 225	6, 951, 595	553, 872	7, 505, 467
Other[2]	784, 427	43, 512	827, 939	9, 474, 482	645, 808	10, 120, 290
Total Buckwheat No. 1 and smaller	1, 040, 155	99, 239	1, 139, 394	73, 009, 330	16, 038, 458	89, 047, 788
Grand total	1, 041, 123	100, 979	1, 142, 102	186, 537, 549	39, 489, 115	226, 026, 664
AVERAGE VALUE PER TON						
Lump[1] and Broken	-----	-----	-----	$14. 35	$13. 04	$13. 98
Egg	-----	-----	-----	12. 76	12. 85	12. 76
Stove	-----	-----	-----	12. 99	12. 88	12. 98
Chestnut	-----	-----	-----	13. 06	13. 42	13. 11
Pea	$5. 44	$6. 69	$6. 18	10. 39	11. 46	10. 77
Total Pea and larger	5. 44	6. 69	6. 18	12. 50	12. 32	12. 47
Buckwheat No. 1	3. 00	6. 00	5. 61	9. 21	9. 84	9. 35
Buckwheat No. 2 (Rice)	-----	5. 50	5. 50	8. 36	8. 76	8. 46
Buckwheat No. 3 (Barley)	3. 33	6. 16	3. 48	6. 36	6. 18	6. 33
Buckwheat No. 4	3. 45	3. 68	3. 48	4. 87	4. 16	4. 83
Buckwheat No. 5	3. 94	3. 03	3. 68	4. 72	3. 71	4. 62
Other[2]	1. 40	4. 10	1. 45	3. 39	2. 79	3. 34
Total Buckwheat No. 1 and smaller	1. 65	3. 72	1. 73	6. 13	7. 39	6. 33
Grand total	1. 65	3. 75	1. 74	8. 89	9. 69	9. 02

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[1] Quantity of Lump included is insignificant.
[2] Includes various mixtures of Buckwheat Nos. 2-5 and some fine coal shipped direct from silt banks.

TABLE 9.—**Pennsylvania anthracite produced in 1957, by counties**

County	Shipments outside producing regions		Sold to local trade		Colliery fuel		Total production	
	Net tons	Value [1]	Net tons	Value	Net tons	Value	Net tons	Value [1]
Carbon	819,792	$7,577,066	75,062	$823,156	5,552	$45,663	900,406	$8,445,885
Columbia	769,017	7,313,716	24,536	263,951	2,011	14,080	795,564	7,591,747
Dauphin	108,902	665,462	109,810	769,958	5	51	218,717	1,435,471
Lackawanna	2,052,062	20,339,310	489,565	5,771,615	84,349	392,214	2,625,976	26,503,139
Lancaster, Lebanon, Northampton, and Snyder [2]	594,769	944,222	2,083	9,576	------	------	596,852	953,798
Luzerne	6,612,937	65,895,912	1,632,457	15,552,866	144,178	951,984	8,389,572	82,400,762
Northumberland	2,815,364	22,244,606	595,348	5,259,493	4,647	36,521	3,415,359	27,540,620
Schuylkill	7,211,714	61,547,521	1,140,790	11,003,755	38,512	286,515	8,391,016	72,837,791
Sullivan	1,094	9,734	3,755	34,745	10	110	4,859	44,589
Total	20,985,651	186,537,549	4,073,406	39,489,115	279,264	1,727,138	25,338,321	227,753,802

[1] Value given for shipments is value at which coal left possession of producing company; does not include margins of separately incorporated sales companies.

[2] Counties producing dredge coal only.

Of the total coal produced at strip pits in 1957, 52 percent was produced in the Schuylkill region (no change from 1956); 27 percent in the Wyoming (down 1 percent); and, 21 percent in the Lehigh. Table 13 shows data on anthracite produced by stripping for selected years in the period 1915–57 and figure 5 the trend in regional stripping activities.

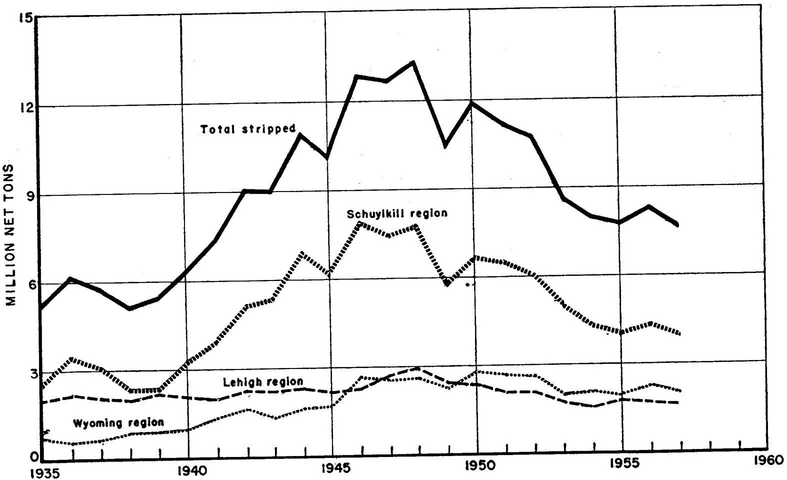

FIGURE 5.—Pennsylvania anthracite mined from strip pits, by regions, 1935–57.

TABLE 10.—Sizes of Pennsylvania anthracite shipped to points outside producing region, 1953–57, by regions, in percent of total

(Excludes dredge coal)

Size	Percent of total shipments									
	Lehigh region					Schuylkill region				
	1953	1954	1955	1956	1957	1953	1954	1955	1956	1957
Lump [1] and Broken	0.4	0.5	0.2	([2])	([2])	0.1	0.2	0.2	0.1	0.5
Egg	1.2	1.0	1.1	0.9	0.9	1.4	1.2	1.1	1.1	.7
Stove	18.4	18.0	16.3	13.0	10.8	14.7	15.3	15.3	14.0	12.6
Chestnut	19.9	18.6	17.9	15.7	13.6	16.7	17.1	17.3	16.7	15.0
Pea	7.3	7.4	9.5	7.8	8.2	8.0	8.7	8.6	8.6	8.5
Total Pea and larger	47.2	45.5	45.0	37.4	33.5	40.9	42.5	42.5	40.5	37.3
Buckwheat No. 1	12.4	11.8	11.4	9.8	9.4	14.6	13.4	11.8	12.3	11.9
Buckwheat No. 2 (Rice)	8.0	7.7	7.3	6.0	6.1	9.1	8.4	8.7	8.4	8.5
Buckwheat No. 3 (Barley)	9.6	9.0	9.4	8.6	8.7	14.6	14.5	12.6	13.0	14.2
Buckwheat No. 4	8.6	12.2	8.3	9.7	9.0	10.5	8.3	9.3	7.5	7.7
Buckwheat No. 5	7.0	1.0	5.9	10.0	11.3	4.5	4.3	4.6	9.9	10.0
Other	7.2	12.8	12.7	18.5	22.0	5.8	8.6	10.5	8.4	10.4
Total Buckwheat No. 1 and smaller	52.8	54.5	55.0	62.6	66.5	59.1	57.5	57.5	59.5	62.7

Size	Wyoming region					Sullivan County				
Lump [1] and Broken	0.3	0.3	0.2	0.2	0.1	------	------	------	------	------
Egg	2.0	2.7	1.7	1.6	1.5	------	------	------	------	------
Stove	27.1	25.2	26.6	25.4	22.0	4.2	2.2	------	------	------
Chestnut	28.0	24.6	27.5	28.7	27.0	24.9	22.3	75.0	15.7	26.9
Pea	7.6	8.1	7.5	8.6	9.7	21.3	18.5	------	6.6	27.4
Total Pea and larger	65.0	60.9	63.5	64.5	60.3	50.4	43.0	75.0	22.3	54.3
Buckwheat No. 1	14.0	12.8	11.7	12.1	12.6	11.5	15.2	25.0	------	------
Buckwheat No. 2 (Rice)	7.4	8.9	7.3	7.7	7.9	------	------	------	50.7	45.7
Buckwheat No. 3 (Barley)	8.3	10.1	9.7	9.2	10.0	------	41.8	------	27.0	------
Buckwheat No. 4	2.6	3.8	3.6	3.0	2.6	------	------	------	------	------
Buckwheat No. 5	.5	1.6	.9	.7	1.1	------	------	------	------	------
Other	2.2	1.9	3.3	2.8	5.5	38.1	------	------	------	------
Total Buckwheat No. 1 and smaller	35.0	39.1	36.5	35.5	39.7	49.6	57.0	25.0	77.7	45.7

Size	Total									
	Excluding Sullivan County					Including Sullivan County				
Lump [1] and Broken	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.2	0.1	0.3
Egg	1.6	1.8	1.4	1.2	1.0	1.6	1.8	1.4	1.3	1.0
Stove	19.7	19.6	19.8	18.1	15.5	19.7	19.6	19.8	18.0	15.5
Chestnut	21.2	20.3	21.3	20.9	18.9	21.2	20.2	21.3	20.9	18.9
Pea	7.7	8.3	8.3	8.5	8.9	7.7	8.3	8.3	8.5	8.9
Total Pea and larger	50.4	50.2	51.0	48.8	44.6	50.4	50.1	51.0	48.8	44.6
Buckwheat No. 1	14.0	12.9	11.7	11.7	11.7	14.0	12.9	11.7	11.7	11.7
Buckwheat No. 2 (Rice)	8.3	8.5	7.9	7.7	7.8	8.3	8.5	7.9	7.7	7.8
Buckwheat No. 3 (Barley)	11.5	12.0	10.9	10.7	11.7	11.5	12.0	10.9	10.7	11.7
Buckwheat No. 4	7.4	7.1	6.9	6.3	6.1	7.4	7.1	6.9	6.3	6.1
Buckwheat No. 5	3.6	2.7	3.4	6.5	7.1	3.6	2.8	3.4	6.5	7.1
Other	4.8	6.6	8.2	8.3	11.0	4.8	6.6	8.2	8.3	11.0
Total Buckwheat No. 1 and smaller	49.6	49.8	49.0	51.2	55.4	49.6	49.9	49.0	51.2	55.4

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[1] Quantity of Lump included is insignificant.
[2] Less than 0.05 percent.

TABLE 11.—Sizes of Pennsylvania anthracite shipped to points inside producing region, 1953–57, by regions, in percent of total

(Excludes dredge coal)

Size	Percent of total shipments									
	Lehigh region					Schuylkill region				
	1953	1954	1955	1956	1957	1953	1954	1955	1956	1957
Lump[1] or Broken	(2)	(2)	------	------	------	0.1	(2)	(2)	0.1	(2)
Egg	0.1	0.1	(2)	0.1	0.4	.2	0.1	0.1	.2	0.1
Stove	1.4	1.6	1.4	1.3	2.5	9.7	9.3	13.4	10.7	10.2
Chestnut	18.5	17.8	15.3	17.2	15.8	19.5	17.8	22.4	22.4	20.1
Pea	35.4	35.4	29.6	30.8	29.2	20.1	21.5	18.7	19.4	17.0
Total Pea and larger	55.4	54.9	46.3	49.4	47.9	49.6	48.7	54.6	52.8	47.4
Buckwheat No. 1	16.7	15.7	13.3	15.2	16.4	13.4	14.5	14.5	15.9	14.9
Buckwheat No. 2 (Rice)	21.8	23.1	20.9	25.0	27.2	10.3	11.5	11.2	13.6	12.9
Buckwheat No. 3 (Barley)	5.6	5.9	5.5	6.3	7.4	11.4	10.2	12.8	11.5	14.5
Buckwheat No. 4	.5	.4	1.8	.4	0.2	9.7	8.2	5.7	1.8	3.9
Buckwheat No. 5	------	------	------	------	.9	2.2	.1	.7	.9	1.8
Other	------	------	12.2	3.7	------	3.4	6.8	.5	3.5	4.6
Total Buckwheat No. 1 and smaller	44.6	45.1	53.7	50.6	52.1	50.4	51.3	45.4	47.2	52.6
Size	Wyoming region					Sullivan County				
Lump[1] and Broken	1.3	1.5	1.9	1.9	1.0	------	------	------	------	------
Egg	.2	.1	.3	.2	.1	------	------	------	------	------
Stove	2.7	2.0	2.5	1.9	2.3	4.0	2.7	------	------	------
Chestnut	13.1	11.7	13.0	12.1	12.0	24.0	25.2	14.3	43.2	38.1
Pea	31.7	32.5	32.9	31.0	31.1	20.6	23.9	17.0	27.5	25.2
Total Pea and larger	49.0	47.8	50.6	47.1	46.5	48.6	51.8	31.3	70.7	63.3
Buckwheat No. 1	16.9	16.9	18.2	18.1	19.3	14.6	16.0	20.1	------	------
Buckwheat No. 2 (Rice)	11.9	11.4	12.2	11.0	11.7	------	------	48.6	12.6	36.7
Buckwheat No. 3 (Barley)	13.5	11.9	10.6	11.0	9.6	------	32.2	------	16.7	------
Buckwheat No. 4	1.9	2.1	1.4	------	0.3	------	------	------	------	------
Buckwheat No. 5	4.6	4.5	------	5.6	5.4	------	------	------	------	------
Other	2.2	5.4	7.0	7.2	7.2	36.8	------	------	------	------
Total Buckwheat No. 1 and smaller	51.0	52.2	49.4	52.9	53.5	51.4	48.2	68.7	29.3	36.7
Size	Total									
	Excluding Sullivan County					Including Sullivan County				
Lump[1] and Broken	0.9	0.8	1.0	1.0	0.5	0.9	0.9	1.0	1.0	0.5
Egg	.2	.1	.2	.1	.1	.2	.1	.2	.2	.2
Stove	4.6	4.5	6.4	5.5	5.8	4.6	4.5	6.3	5.5	5.8
Chestnut	15.4	14.3	16.6	16.8	15.8	15.4	14.3	16.7	16.8	15.8
Pea	28.7	29.0	27.4	26.2	24.8	28.7	29.0	27.4	26.2	24.8
Total Pea and larger	49.8	48.7	51.6	49.6	47.0	49.8	48.8	51.6	49.7	47.1
Buckwheat No. 1	15.9	16.0	16.4	17.0	17.1	15.9	16.0	16.4	17.0	17.1
Buckwheat No. 2 (Rice)	12.3	12.4	12.7	13.1	13.5	12.3	12.4	12.8	13.1	13.6
Buckwheat No. 3 (Barley)	12.2	10.8	10.8	10.8	11.6	12.2	10.8	10.8	10.8	11.5
Buckwheat No. 4	4.0	4.1	3.0	.8	1.8	4.0	4.0	3.0	.8	1.8
Buckwheat No. 5	3.5	2.6	.3	3.3	3.5	3.5	2.6	.2	3.2	3.4
Other	2.3	5.4	5.2	5.4	5.5	2.3	5.4	5.2	5.4	5.5
Total Buckwheat No. 1 and smaller	50.2	51.3	48.4	50.4	53.0	50.2	51.2	48.4	50.3	52.9

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[1] Quantity of Lump included is insignificant.
[2] Less than 0.05 percent.

TABLE 12.—Sizes of Pennsylvania anthracite shipped to points outside and inside producing region in 1957, by regions, in percent of total

(Excludes dredge coal)

Size	Percent of total shipments								
	Lehigh region			Schuylkill region			Wyoming region		
	Shipped outside region	Local sales	Total	Shipped outside region	Local sales	Total	Shipped outside region	Local sales	Total
Lump [1] and Broken	(2)	-------	(2)	0.5	(2)	0.4	0.1	1.0	0.3
Egg	0.9	0.4	0.9	.7	0.1	.6	1.5	.1	1.2
Stove	10.8	2.5	10.1	12.6	10.2	12.2	22.0	2.3	17.8
Chestnut	13.6	15.8	13.8	15.0	20.1	15.8	27.0	12.0	23.7
Pea	8.2	29.2	9.8	8.5	17.0	9.9	9.7	31.1	14.3
Total Pea and larger	33.5	47.9	34.6	37.3	47.4	38.9	60.3	46.5	57.3
Buckwheat No. 1	9.4	16.4	9.9	11.9	14.9	12.4	12.6	19.3	14.0
Buckwheat No. 2 (Rice)	6.1	27.2	7.7	8.5	12.9	9.2	7.9	11.7	8.7
Buckwheat No. 3 (Barley)	8.7	7.4	8.6	14.2	14.5	14.3	10.0	9.6	10.0
Buckwheat No. 4	9.0	0.2	8.3	7.7	3.9	7.1	2.6	0.3	2.1
Buckwheat No. 5	11.3	.9	10.5	10.0	1.8	8.6	1.1	5.4	2.0
Other	22.0	-------	20.4	10.4	4.6	9.5	5.5	7.2	5.9
Total Buckwheat No. 1 and smaller	66.5	52.1	65.4	62.7	52.6	61.1	39.7	53.5	42.7

Size	Sullivan County			Total					
				Excluding Sullivan County			Including Sullivan County		
Lump [1] and Broken	-------	-------	-------	0.3	0.5	0.3	0.3	0.5	0.3
Egg	-------	-------	-------	1.0	.1	.9	1.0	.2	.9
Stove	-------	-------	-------	15.5	5.8	13.9	15.5	5.8	13.9
Chestnut	26.9	38.1	35.5	18.9	15.8	18.4	18.9	15.8	18.4
Pea	27.4	25.2	25.8	8.9	24.8	11.5	8.9	24.8	11.5
Total Pea and larger	54.3	63.3	61.3	44.6	47.0	45.0	44.6	47.1	45.0
Buckwheat No. 1	-------	-------	-------	11.7	17.1	12.6	11.7	17.1	12.6
Buckwheat No. 2 (Rice)	45.7	36.7	38.7	7.8	13.5	8.8	7.8	13.6	8.8
Buckwheat No. 3 (Barley)	-------	-------	-------	11.7	11.6	11.6	11.7	11.5	11.6
Buckwheat No. 4	-------	-------	-------	6.1	1.8	5.4	6.1	1.8	5.4
Buckwheat No. 5	-------	-------	-------	7.1	3.5	6.5	7.1	3.4	6.5
Other	-------	-------	-------	11.0	5.5	10.1	11.0	5.5	10.1
Total Buckwheat No. 1 and smaller	45.7	36.7	38.7	55.4	53.0	55.0	55.4	52.9	55.0

[1] Quantity of Lump is insignificant.
[2] Less than 0.05 percent.

Culm-Bank Coal.—Demand for the smaller sizes of anthracite was stronger during 1957 in both American and export markets than for the larger, or space-heating, sizes. Consequently, production at culm and silt banks fell less than at deep mines and strip pits. Output from banks totaled 4.5 million tons in 1957—a decrease of 5 percent—as compared with the 12-percent decline in total production, 16-percent underground, and 10-percent at strip pits. Of the total produced from banks in 1957, 55 percent was obtained in the Schuylkill region (58 percent in 1956), 32 percent in the Lehigh (31 percent in 1956), and 13 percent in the Wyoming (11 percent in 1956). Data on the recovery of anthracite from culm and silt banks are shown, by fields and regions, in tables 6, 7, and 14.

Dredge Coal.—In 1957, 658,000 tons of small-size anthracite was recovered from rivers and creeks draining the Pennsylvania anthracite region—a decrease of 8 percent from 1956. Of the total 1957 output, 31,000 tons was produced by dredges operating in the Lehigh

TABLE 13.—Production of Pennsylvania anthracite from strip pits, 1915, 1920, 1925, 1930, and 1951–57

	Mined by stripping (net tons)	Percent of fresh-mined total that was stripped	Number of men employed	Average number of days worked
1915	1, 121, 603	(1)	(1)	(1)
1920	2, 054, 441	2. 5	(1)	(1)
1925	1, 578, 478	2. 7	(1)	(1)
1930	2, 536, 288	3. 8	(1)	(1)
1951	11, 135, 990	29. 7	7, 647	220
1952	10, 696, 705	30. 2	7, 100	212
1953	8, 606, 482	32. 5	6, 168	193
1954	7, 939, 680	32. 0	4, 837	202
1955	7, 703, 907	34. 7	[2] 4, 642	[2] 205
1956	8, 354, 230	35. 7	4, 840	216
1957:				
Lehigh region	1, 624, 040	54. 6	1, 079	197
Schuylkill region	3, 900, 607	46. 0	2, 517	201
Wyoming region	2, 013, 651	23. 2	945	232
Total, excluding Sullivan County	7, 538, 298	37. 4	4, 541	207
Sullivan County	4, 859	100. 0	5	243
Total	7, 543, 157	37. 4	4, 546	207

[1] Data not available.
[2] Estimated.

TABLE 14.—Production of Pennsylvania anthracite from culm banks, by regions, 1935–57, in net tons

Year	Lehigh	Schuylkill	Wyoming	Sullivan County	Total
1935	192, 790	1, 748, 960	760, 718	------------	2, 702, 468
1936	136, 058	2, 532, 116	525, 798	------------	3, 193, 972
1937	101, 239	2, 178, 482	442, 878	------------	2, 722, 599
1938	53, 037	1, 941, 896	345, 511	------------	2, 340 444
1939	64, 180	2, 159, 548	360, 086	------------	2, 583, 814
1940	192, 878	2, 109, 557	480, 603	------------	2, 783, 038
1941	326, 755	2, 881, 049	449, 062	------------	3, 656, 866
1942	745, 934	3, 529, 757	459, 373	------------	4, 735, 064
1943	1, 944, 047	4, 577, 917	1, 041, 841	19, 893	7, 583, 698
1944	2, 125, 317	5, 787, 036	1, 673, 994	13, 833	9, 600, 180
1945	2, 086, 864	4, 936, 907	1, 728, 440	34, 448	8, 786, 659
1946	1, 875, 590	4, 752, 141	1, 780, 874	22, 487	8, 431, 092
1947	1, 044, 501	3, 947, 016	1, 409, 217	2, 912	6, 403, 646
1948	796, 114	3, 729, 542	1, 098, 123	------------	5, 623, 779
1949	694, 763	2, 778, 131	956, 250	------------	4, 429, 144
1950	366, 069	2, 533, 535	565, 829	1, 877	3, 467, 310
1951	566, 613	3, 578, 795	484, 792	------------	4, 630, 200
1952	791, 445	3, 407, 974	566, 097	------------	4, 765, 516
1953	714, 646	2, 792, 323	504, 031	------------	4, 011, 000
1954	797, 761	2, 320, 006	447, 715	------------	3, 565, 482
1955	862, 539	1, 934, 492	416, 015	------------	3, 213, 046
1956	1, 493, 381	2, 750, 838	530, 580	------------	4, 774, 799
1957	1, 457, 869	2, 479, 241	584, 300	------------	4, 521, 410

River, 10,000 tons from the Schuylkill, and 617,000 tons from the Susquehanna. Details on the production and value of river, or dredge, coal are shown in tables 15 and 16. Owing to the fact that the largest producer of dredge coal reports cost of production to the Bureau of Mines rather than market value, the value data shown for 1954–57, inclusive, should not be construed as representing a fair market price.

TABLE 15.—Pennsylvania anthracite produced by dredges in 1957, by rivers (including tributaries)

River	Production (net tons)	Value	
		Total	Average
Lehigh	30,650	$114,658	$3.74
Schuylkill	10,167	44,035	4.33
Susquehanna	616,884	984,459	1.60
Total	657,701	1,143,152	1.74

TABLE 16.—Pennsylvania anthracite produced by dredges, 1935–57, by rivers (including tributaries)

Year	Net tons				Value	
	Lehigh River	Schuylkill River	Susquehanna River	Total	Total	Average per ton
1935	78,578	73,326	438,563	590,467	$517,304	$0.88
1936	63,327	31,669	451,688	546,684	581,679	1.06
1937	[1] 95,065	(1)	665,409	760,474	842,052	1.11
1938	[1] 123,452	(1)	447,572	571,024	570,579	1.00
1939	62,134	67,539	574,187	703,860	746,000	1.06
1940	[1] 78,947	(1)	863,997	942,944	1,097,000	1.16
1941	47,838	396,522	1,073,203	1,517,563	1,839,784	1.21
1942	9,385	268,919	1,006,729	1,285,033	1,478,719	1.15
1943	37,452	342,815	954,470	1,334,737	1,972,777	1.48
1944	40,894	494,371	837,472	1,372,737	2,084,431	1.52
1945	41,409	366,161	797,656	1,205,226	1,924,148	1.60
1946	37,441	247,757	847,196	1,132,394	2,091,324	1.85
1947	46,478	158,102	1,015,126	1,219,706	2,480,068	2.03
1948	54,284	67,871	865,849	988,004	2,291,752	2.32
1949	22,131	52,012	790,979	865,122	2,131,096	2.46
1950	21,877	34,222	563,465	619,564	1,677,508	2.71
1951	25,344	27,454	508,770	561,568	1,576,576	2.81
1952	17,402	30,407	324,245	372,054	1,109,778	2.98
1953	31,391	20,643	386,147	438,181	1,449,149	3.31
1954	16,015	----------	709,892	725,907	1,810,026	2.49
1955	29,935	60,256	698,652	788,843	1,844,835	2.34
1956	44,262	5,540	666,485	716,287	1,273,415	1.78
1957	30,650	10,167	616,884	657,701	1,143,152	1.74

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[1] Schuylkill included with Lehigh in 1937, 1938, and 1940.

Weekly and Monthly Data.—The Bureau of Mines estimates, in a series of Weekly Anthracite Reports, weekly and monthly anthracite output. These estimates are predicated upon carloading data furnished by the Association of American Railroads, truck data supplied by the Pennsylvania Department of Mines and Mineral Industries, and factors established for colliery fuel and dredge production. After completion of the annual canvass, the weekly and monthly estimates are adjusted to the yearly total as presented in tables 17 and 18.

In addition to the estimates of production, the Weekly Anthracite Reports also present salient statistics on monthly developments in the anthracite industry. Collected from a large number of sources, these data include such subjects as rail and truck shipments, Lake-dock trade, exports, imports, stocks, and consumption by railroads and electric utilities, producer and retail-dealer stocks, retail deliveries, wholesale price indexes, working time, and average earnings.

TABLE 17.—Estimated weekly production of Pennsylvania anthracite in 1957 [1]

Week ended—	Thousand net tons	Week ended—	Thousand net tons	Week ended—	Thousand net tons	Week ended—	Thousand net tons
Jan. 5	[2] 342	Apr. 13	495	July 20	435	Oct. 26	443
12	619	20	479	27	566	Nov. 2	432
19	562	27	486	Aug. 3	548	9	509
26	611	May 4	496	10	509	16	468
Feb. 2	638	11	476	17	468	23	487
9	598	18	506	24	524	30	372
16	419	25	484	31	577	Dec. 7	453
23	546	June 1	542	Sept. 7	462	14	481
Mar. 2	456	8	599	14	553	21	467
9	442	15	609	21	530	28	272
16	460	22	636	28	529	31	[2] 154
23	420	29	686	Oct. 5	569		
30	384	July 6	69	12	489	Total	25,338
Apr. 6	385	13	77	19	519		

[1] Estimated from weekly carloadings as reported by the Association of American Railroads; adjusted to annual production total from Bureau of Mines canvass.

[2] Figures represent output of working days in that part of week included in calendar year 1957. Preliminary production for week of January 4, 1958, was 298,000 tons. Revised total for week of January 5, 1957, was 403,000 tons.

TABLE 18.—Estimated monthly production of Pennsylvania anthracite, 1950–57, in thousand net tons [1]

Month	1950	1951	1952	1953	1954	1955	1956	1957
January	2,893	4,316	4,221	2,707	2,874	2,454	2,743	2,625
February	2,563	3,621	3,362	2,438	2,525	2,568	2,360	2,072
March	4,847	2,244	3,140	2,354	2,364	2,007	2,052	1,798
April	3,331	2,675	3,384	2,048	2,100	1,723	2,258	2,037
May	4,228	3,723	3,400	2,869	2,013	1,985	1,947	2,294
June	4,166	3,848	3,293	2,975	2,387	2,130	2,470	2,551
July	2,855	2,847	2,522	2,551	2,080	1,845	1,890	1,478
August	4,386	3,612	2,704	2,452	2,270	1,904	2,729	2,294
September	3,835	3,267	3,761	2,732	2,416	2,453	2,509	2,173
October	4,282	4,675	4,213	2,994	2,353	2,244	2,971	2,262
November	3,355	4,129	3,405	2,386	2,681	2,385	2,629	1,928
December	3,336	3,713	3,178	2,443	3,020	2,507	2,342	1,826
Total	44,077	42,670	40,583	30,949	29,083	26,205	28,900	25,338

[1] Production is estimated from weekly carloadings as reported by the Association of American Railroads and includes mine fuel, coal sold locally, and dredge coal.

Mechanical Loading.—In 1957, for the first time in the history of the Pennsylvania anthracite industry, the quantity of coal loaded mechanically underground exceeded the amount loaded by hand. Since 1953 (when the percentage mechanically loaded underground dropped to a postwar low of 38 percent) there has been a steady annual increase in the percentage of underground output loaded by mechanical means. During the same period underground production declined from 17.9 million tons in 1953 to 12.6 million in 1957 (29 percent), whereas the tonnage loaded mechanically decreased only 3 percent and hand loading decreased 46 percent.

As the number of mechanical loaders has also decreased, the tonnage still being loaded mechanically indicates that producers have undoubtedly concentrated underground production at the most efficient mechanically equipped mines. Also, anthracite producers are, without doubt, obtaining more effective results from the smaller number of machines reported in use.

As the coal measures of the Northern field are relatively flatter, the mines generally are more mechanized than those in the other fields. Hence, 85 percent of the total coal loaded mechanically underground in 1957 was produced in the Northern field, followed by the Southern and Western Middle fields with 6 percent each, and the Eastern Middle field with 3 percent. When compared with 1956, the tonnages loaded mechanically declined 10, 6, and 5 percent in the Northern, Western Middle, and Southern fields, respectively, and gained 2 percent in the Eastern Middle field.

Reflecting the relative growth of mechanical loading, of the total 1957 underground production in the Northern field, 85 percent was loaded mechanically as compared with 76 percent in 1956; in the Eastern Middle, 63 percent as compared with 50 percent; and, in the Southern, 14 percent compared with 12 percent in 1956. The Western Middle showed the only decrease—a decline from 16 percent of the field's 1956 underground total to 15 percent in 1957. Tables 19–21 present detailed data on loading equipment and mechanical loading, while figure 6 shows the trend in mechanical loading, hand loading, and stripping for the period 1935–57.

Cutting Machines.—Because of physical and mechanical difficulties encountered in mining the steeply pitching seams of Pennsylvania anthracite, most of the tonnage produced underground is shot from the solid face, and only a small quantity is undercut. Hence, for

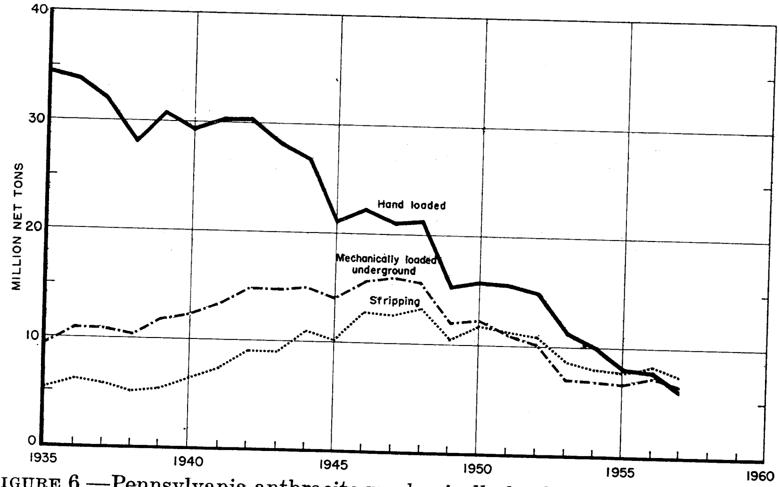

FIGURE 6.—Pennsylvania anthracite mechanically loaded, hand loaded, and stripped, 1935–57.

TABLE 19.—Pennsylvania anthracite loaded mechanically underground, 1956–57, by fields, in net tons

Field	Scraper loaders [1]		Pit-car loaders		Hand-loaded face conveyors, all types [2]		Total mechanically loaded	
	1956	1957	1956	1957	1956	1957	1956	1957
Northern	1,768,880	1,688,678	70,129	40,842	4,435,371	3,941,437	6,274,380	5,670,957
Eastern Middle	51,873	49,998			110,889	116,218	162,762	166,216
Western Middle	204,818	126,019			248,984	299,810	453,802	425,829
Southern	132,180	113,897			284,986	280,580	417,166	394,477
Total	2,157,751	1,978,592	70,129	40,842	5,080,230	4,638,045	7,308,110	6,657,479

[1] Includes mobile loaders.
[2] Shaker chutes, including those equipped with duckbills.

TABLE 20.—Pennsylvania anthracite loaded mechanically underground, 1953–57

Year	Scraper loaders		Mobile loaders		Conveyors [1] and pit-car loaders		Total mechanically loaded	
	Number of units	Net tons loaded	Number of units	Net tons loaded	Number of units	Net tons loaded	Number of units	Net tons loaded
1953	489	1, 206, 241	39	22, 252	2, 784	5, 610, 276	3, 312	6, 838, 769
1954	359	959, 532	68	445, 721	2, 277	5, 572, 782	2, 704	6, 978, 035
1955	279	761, 945	79	582, 526	1, 940	5, 316, 468	2, 298	6, 660, 939
1956	303	1, 080, 339	80	1, 077, 412	1, 593	5, 150, 359	1, 976	7, 308, 110
1957	295	1, 179, 099	66	799, 493	1, 437	4, 678, 887	1, 798	6, 657,479

[1] Includes duckbills and other self-loading conveyors.

TABLE 21.—Trends in mechanical loading, hand loading, and stripping of Pennsylvania anthracite, 1927–57

(Mechanical loading includes coal handled on pit-car loaders and hand-loaded face conveyors)

Year	Fresh-mined coal							
	Underground					From strip pits		Total
	Mechanical loading (net tons)	Percent of total underground	Hand loading (net tons)	Percent of total underground	Total (net tons)	Net tons	Percent of total fresh mined	
1927	[1] 2, 223, 281	3. 0	71, 434, 537	97. 0	73, 657, 818	2, 153, 156	2. 8	75, 810, 974
1928	[1] 2, 351, 074	3. 4	67, 373, 788	96. 6	69, 724, 862	2, 422, 924	3. 4	72, 147, 786
1929	3, 470, 158	5. 0	66, 493, 690	95. 0	69, 963, 848	1, 911, 766	2. 7	71, 875, 614
1930	4, 467, 750	6. 9	60, 458, 344	93. 1	64, 926, 094	2, 536, 288	3. 8	67, 462, 382
1931	4, 384, 780	8. 2	49, 074, 722	91. 8	53, 459, 502	3, 813, 237	6. 7	57, 272, 739
1932	5, 433, 340	12. 4	38, 400, 820	87. 6	43, 834, 160	3, 980, 973	8. 3	47, 815, 133
1933	6, 557, 267	16. 0	34, 474, 844	84. 0	41, 032, 111	4, 932, 069	10. 7	45, 964, 180
1934	9, 284, 486	19. 1	39, 290, 255	80. 9	48, 574, 741	5, 798, 138	10. 7	54, 372, 879
1935	9, 279, 057	21. 2	34, 503, 819	78. 8	43, 782, 876	5, 187, 072	10. 6	48, 969, 948
1936	10, 827, 946	24. 2	33, 898, 560	75. 8	44, 726, 506	6, 203, 267	12. 2	50, 929, 773
1937	10, 683, 837	25. 1	31, 882, 514	74. 9	42, 566, 351	5, 696, 018	11. 8	48, 262, 369
1938	10, 151, 669	26. 6	27, 990, 628	73. 4	38, 142, 297	5, 095, 341	11. 8	43, 237, 638
1939	11, 773, 833	27. 7	30, 797, 715	72. 3	42, 571, 548	5, 486, 479	11. 4	48, 058, 027
1940	12, 326, 000	29. 7	29, 190, 837	70. 3	41, 516, 837	6, 352, 700	13. 3	47, 869, 537
1941	13, 441, 987	30. 6	30, 435, 277	69. 4	43, 877, 264	7, 316, 574	14. 3	51, 193, 838
1942	14, 741, 459	32. 6	30, 495, 240	67. 4	45, 236, 699	9, 070, 933	16. 7	54, 307, 632
1943	14, 745, 793	34. 5	27, 990, 005	65. 5	42, 735, 798	8, 989, 387	17. 4	51, 725, 185
1944	14, 975, 146	35. 8	26, 800, 270	64. 2	41, 775, 416	10, 953, 030	20. 8	52, 728, 446
1945	13, 927, 955	39. 9	20, 957, 744	60. 1	34, 885, 699	10, 056, 325	22. 4	44, 942, 024
1946	15, 619, 162	41. 0	22, 465, 295	59. 0	38, 084, 457	12, 858, 930	25. 2	50, 943, 387
1947	16, 054, 011	43. 4	20, 909, 101	56. 6	36, 963, 112	12, 603, 545	25. 4	49, 566, 657
1948	15, 742, 368	42. 3	21, 432, 923	57. 7	37, 175, 291	13, 352, 874	26. 4	50, 528, 165
1949	11, 858, 088	43. 9	15, 172, 562	56. 1	27, 030, 650	10, 376, 808	27. 7	37, 407, 458
1950	12, 335, 650	43. 8	15, 820, 245	56. 2	28, 155, 895	11, 833, 934	29. 6	39, 989, 829
1951	10, 847, 787	41. 2	15, 494, 452	58. 8	26, 342, 239	11, 135, 990	29. 7	37, 478, 229
1952	10, 034, 464	40. 5	14, 713, 819	59. 5	24, 748, 283	10, 696, 705	30. 2	35, 444, 988
1953	6, 838, 769	38. 2	11, 054, 720	61. 8	17, 893, 489	8, 606, 482	32. 5	26, 499, 971
1954	6, 978, 035	41. 4	9, 874, 373	58. 6	16, 852, 408	7, 939, 680	32. 0	24, 792, 088
1955	6, 660, 939	45. 9	7, 837, 819	54. 1	14, 498, 758	7, 703, 907	34. 7	22, 202, 665
1956	7, 308, 110	48. 5	7, 746, 794	51. 5	15, 054, 904	8, 354, 230	35. 7	23, 409, 134
1957	6, 657, 479	52. 8	5, 958, 574	47. 2	12, 616, 053	7, 543, 157	37. 4	20, 159, 210

[1] As reported by Commonwealth of Pennsylvania, Department of Mines.

several years, the tonnage mechanically cut has been less than one-half million tons annually, totaling 292 thousand tons in 1957 compared with 400 thousand in 1956. The decline in underground production in recent years, accompanied by the closing of many underground mines, has not only kept undercutting low but has drastically reduced the number of cutting machines being used. As recently as 1952, 146 cutters were reported in use; however, by 1956 the number had fallen to 29 and in 1957 to 25. Again, as in 1956, each of the 25 machines reported was used in the relatively flat seams of the Wyoming region.

Power Equipment.—Despite declining production of anthracite from culm banks and strip pits, the number of pieces of equipment reported used in recovering coal from these sources showed a net gain of 19 over 1956. Of the 465 machines reported, 208 were power shovels and 257 draglines—an increase of 4 shovels and 15 draglines. In stripping operations 169 shovels and 225 draglines were employed, while 38 shovels and 26 draglines were used in bankwork. One shovel and 6 draglines were used at both types of operations. Table 22 presents data on the number of pieces of power equipment in use for the years 1955–1957, by type of power.

TABLE 22.—Power shovels and draglines used in stripping Pennsylvania anthracite, 1955–57, by type of power

Type of power	1955			1956			1957		
	Number of power shovels	Number of draglines	Total	Number of power shovels	Number of draglines	Total	Number of power shovels	Number of draglines	Total
Gasoline	19	6	25	24	17	41	22	11	33
Electric	45	48	93	52	42	94	52	50	102
Diesel	127	195	322	127	183	310	133	196	329
Steam				1		1	1		1
Total	191	249	440	204	242	446	208	257	465

PRICES AND VALUE OF SALES

Despite the decreased demand in American, Canadian, and foreign markets, Pennsylvania anthracite sold at higher prices in 1957 than in 1956. Although producers increased mine stocks during the year, inventories were not large enough to encourage price cutting or sales at "distress" prices. Also, much of the coal exported to foreign markets was sold under contract and thus contributed to the stability of prices. As a result of the higher wages granted under the new wage agreement, f. o. b. mine prices were advanced in December 1956 by $0.75–$1.25 per ton on Rice and larger sizes and about $0.50 on Barley in an effort to recover the added costs of production. These prices generally remained in effect throughout 1957, except during the customary spring-summer discount period. However, although spring prices were substantially lower for the larger sizes, some major producers increased prices slightly on the smaller coals. Later in the year prices of the smaller sizes again advanced, with the result that, by the end of 1957, prices of the small coals were materially higher. Conversely, prices of the large sizes remained unchanged or were somewhat lower.

According to Saward's Journal, f. o. b. mine prices in effect at the close of 1957 varied within the following limits: Broken, $15.70–$15.95; Egg, $15.20–$16.20; Stove, $15.20–$16.20; Chestnut, $15.20–$16.20; Pea, $11.70–$12.60; Buckwheat No. 1, $10.85–$11.60; Buckwheat No. 2 (Rice), $9.85–$10.60; and Buckwheat No. 3 (Barley), $7.50–$7.75. A comparison of these prices with those being quoted at the end of 1956 reveal no change in the f. o. b. mine price of Broken, but prices of Egg, Stove, and Chestnut varied from no change to $0.55 lower and Pea coal ranged from $0.25 less to $0.30 more. However, Buckwheat No. 1 and 2 (Rice) were being quoted at prices averaging $0.35 to $0.50 higher and Buckwheat No. 3 at $0.50 to $0.75 more. The wholesale price indexes in table 2 also clearly reflect the relatively greater price increases for the smaller coals. No prices are published on Buckwheat No. 4 and smaller, as these sizes customarily are sold at privately negotiated prices; nevertheless, from the average realization data presented in table 26, it is apparent that 1957 prices of these finer sizes also were substantially higher.

The generally higher prices resulting from the new wage agreement, plus the greater revenue obtained from the sale of the smaller sizes, boosted the average value received at the mines (excluding transportation and sales costs) from $8.19 per ton in 1956 to $8.99 in 1957. The growing importance of the small sizes is emphasized by the fact that, while the tonnage of Buckwheat No. 2 and smaller decreased 4 percent from 1956, the revenue from the sale of these sizes increased 13 percent. In contrast, shipments of Buckwheat No. 1 and larger fell 18 percent, but the total value of this group of sizes declined 9 percent.

Tables 24 through 27 show the average value received per ton, by regions. Data on retail prices of selected fuels are shown for certain cities in table 28. Trends of shipments and values are shown for 1950, 1955, and 1957, by size groups, in percent of total, in figure 1.

The prices discussed in this section apply to "standard" anthracite, specifications for which are shown in table 23.

TABLE 23.—Standard anthracite specifications approved and adopted by the Anthracite Committee, effective July 28, 1947

Size	Round test mesh (inches)	Percent					
		Oversize, maximum	Undersize		Maximum impurities [1]		
			Maximum	Minimum	Slate	Bone	Ash [2]
Broken	Through 4⅜ Over 3¼ to 3		15	7½	1½	2	11
Egg	Through 3¼ to 3 Over 2⁷⁄₁₆	5	15	7½	1½	2	11
Stove	Through 2⁷⁄₁₆ Over 1⅝	7½	15	7½	2	3	11
Chestnut	Through 1⅝ Over ¹³⁄₁₆	7½	15	7½	3	4	11
Pea	Through ¹³⁄₁₆ Over ⁹⁄₁₆	10	15	7½	4	5	12
Buckwheat No. 1	Through ⁹⁄₁₆ Over ⁵⁄₁₆	10	15	7½			13
Buckwheat No. 2 (Rice)	Through ⁵⁄₁₆ Over ³⁄₁₆	10	17	7½			13
Buckwheat No. 3 (Barley)	Through ³⁄₁₆ Over ³⁄₃₂	10	20	10			15
Buckwheat No. 4	Through ³⁄₃₂ Over ³⁄₆₄	20	30	10			15
Buckwheat No. 5	Through ³⁄₆₄	30	No limit				16

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[1] When slate content in the sizes from Broken to Chestnut, inclusive, is less than above standards, bone content may be increased by 1½ times the decrease in the slate content under the allowable limits, but slate content specified above shall not be exceeded in any event.

A tolerance of 1 percent is allowed on the maximum percentage of undersize and the maximum percentage of ash content.

The maximum percentage of undersize is applicable only to anthracite as it is produced at the preparation plant. Slate is defined as any material that has less than 40 percent fixed carbon.

Bone is defined as any material that has 40 percent or more, but less than 75 percent, fixed carbon.

[2] Ash determinations are on a dry basis.

TABLE 24.—Average sales realization per net ton of Pennsylvania anthracite, exclusive of dredge coal, shipped to points outside producing region, 1953–57, by regions and sizes

(Value does not include margins of separately incorporated sales companies)

Size	Lehigh region					Schuylkill region				
	1953	1954	1955	1956	1957	1953	1954	1955	1956	1957
Lump [1] and Broken	$14.52	$13.05	$11.80	$12.78	$14.12	$14.12	$12.24	$11.03	$12.19	$14.67
Egg	14.11	12.80	11.14	11.61	13.12	13.53	12.09	11.05	11.93	13.28
Stove	14.31	13.03	11.70	11.94	13.54	13.48	12.08	11.14	11.95	12.81
Chestnut	14.28	12.74	11.81	12.02	13.56	13.37	11.70	11.02	11.87	12.82
Pea	10.79	9.74	8.13	8.50	10.39	10.12	8.87	7.90	8.77	10.36
Total Pea and larger	13.74	12.37	10.97	11.25	12.76	12.78	11.27	10.43	11.24	12.28
Buckwheat No. 1	9.46	8.45	6.61	7.25	9.53	9.14	7.84	6.34	6.95	9.13
Buckwheat No. 2 (Rice)	7.78	7.50	6.66	6.85	8.50	7.31	6.83	6.26	6.50	8.27
Buckwheat No. 3 (Barley)	5.58	5.79	5.29	5.38	6.48	5.23	5.28	5.11	5.35	6.38
Buckwheat No. 4	4.23	4.05	3.91	4.19	5.08	3.81	3.84	3.85	4.05	4.81
Buckwheat No. 5	3.65	3.54	3.18	3.80	4.82	3.90	3.47	3.04	3.65	4.75
Other	3.69	3.43	3.22	3.39	3.83	3.66	3.24	3.21	3.42	3.81
Total Buckwheat No. 1 and smaller	6.09	5.62	4.83	4.79	5.75	6.01	5.45	4.82	5.12	6.28
Total all sizes	9.70	8.69	7.59	7.21	8.10	8.78	7.93	7.20	7.60	8.52

Size	Wyoming region					Sullivan County				
Lump [1] and Broken	$14.08	$12.06	$11.15	$13.15	$12.88	-------	-------	-------	-------	------
Egg	13.62	11.88	10.91	11.70	12.33	-------	-------	-------	-------	------
Stove	14.07	12.30	11.46	12.06	12.97	$14.27	$13.00	-------	-------	------
Chestnut	13.91	12.04	11.45	12.23	13.09	14.18	13.00	$10.00	$10.30	$11.00
Pea	10.69	9.37	8.38	9.38	10.42	11.24	11.00	-------	9.22	10.00
Total Pea and larger	13.59	11.79	11.08	11.77	12.60	12.94	12.14	10.00	9.98	10.49
Buckwheat No. 1	9.52	8.40	6.59	7.37	9.17	9.03	8.00	6.00	-------	------
Buckwheat No. 2 (Rice)	7.76	7.32	6.61	7.00	8.42	-------	-------	-------	6.49	7.00
Buckwheat No. 3 (Barley)	5.67	5.72	5.46	5.53	6.30	-------	3.05	-------	5.07	------
Buckwheat No. 4	4.75	4.11	3.88	4.04	4.97	-------	-------	-------	-------	------
Buckwheat No. 5	4.36	3.33	3.24	3.63	3.99	-------	-------	-------	-------	------
Other	3.52	3.43	3.03	3.42	4.19	4.27	-------	-------	-------	------
Total Buckwheat No. 1 and smaller	7.42	6.59	5.62	6.14	7.19	5.38	4.37	6.00	6.00	7.00
Total all sizes	11.43	9.75	9.09	9.77	10.45	9.19	7.71	9.00	6.89	8.90

Size	Total									
	Excluding Sullivan County					Including Sullivan County				
Lump [1] and Broken	$14.21	$12.39	$11.24	$12.81	$14.35	$14.21	$12.39	$11.24	$12.81	$14.35
Egg	13.65	12.02	10.99	11.78	12.76	13.65	12.02	10.99	11.78	12.76
Stove	13.90	12.32	11.39	12.01	12.99	13.90	12.32	11.39	12.01	12.99
Chestnut	13.77	12.01	11.36	12.07	13.06	13.77	12.01	11.36	12.07	13.06
Pea	10.43	9.18	8.12	8.95	10.39	10.43	9.18	8.12	8.95	10.39
Total Pea and larger	13.31	11.67	10.83	11.50	12.50	13.31	11.67	10.83	11.50	12.50
Buckwheat No. 1	9.32	8.14	6.49	7.16	9.21	9.32	8.14	6.49	7.16	9.21
Buckwheat No. 2 (Rice)	7.53	7.12	6.46	6.74	8.36	7.53	7.12	6.46	6.74	8.36
Buckwheat No. 3 (Barley)	5.39	5.48	5.26	5.41	6.37	5.39	5.48	5.26	5.41	6.37
Buckwheat No. 4	4.01	3.95	3.87	4.09	4.91	4.01	3.95	3.87	4.09	4.91
Buckwheat No. 5	3.84	3.44	3.11	3.69	4.73	3.84	3.44	3.11	3.69	4.73
Other	3.65	3.32	3.18	3.41	3.89	3.65	3.32	3.18	3.41	3.89
Total Buckwheat No. 1 and smaller	6.37	5.83	5.05	5.31	6.38	6.37	5.83	5.05	5.31	6.38
Total all sizes	9.87	8.76	8.00	8.33	9.11	9.87	8.76	8.00	8.33	9.11

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[1] Quantity of Lump included is insignificant.

TABLE 25.—Average sales realization per net ton of Pennsylvania anthracite, exclusive of dredge coal, shipped to points inside producing region, 1953–57, by regions and sizes

(Value does not include margins of separately incorporated sales companies)

Size	Lehigh region					Schuylkill region				
	1953	1954	1955	1956	1957	1953	1954	1955	1956	1957
Lump [1] and Broken	$13.33	$14.00	------	------	------	$14.55	$12.51	$10.97	$11.97	$13.54
Egg	15.71	15.37	$14.42	$13.34	$12.50	14.09	12.43	11.04	12.29	13.11
Stove	14.95	13.61	13.27	13.87	13.45	12.23	11.22	10.94	11.86	12.52
Chestnut	15.38	14.48	14.31	13.65	15.10	12.77	11.34	10.85	11.94	12.50
Pea	11.99	11.43	11.39	11.20	12.72	10.35	9.06	8.60	9.20	10.47
Total Pea and larger	13.21	12.49	12.42	12.13	13.54	11.69	10.31	10.10	10.92	11.78
Buckwheat No. 1	10.23	10.26	10.10	9.81	11.20	8.64	7.47	6.42	6.93	8.95
Buckwheat No. 2 (Rice)	8.59	8.77	8.84	8.58	10.06	6.58	6.55	6.16	6.54	8.07
Buckwheat No. 3 (Barley)	6.35	6.63	6.78	6.87	7.60	4.86	4.99	4.76	5.04	5.92
Buckwheat No. 4	5.26	5.35	4.16	5.26	6.24	3.58	3.37	3.60	3.33	4.16
Buckwheat No. 5	------	------	------	------	3.83	3.40	2.72	2.61	2.68	3.48
Other	------	------	3.25	4.00	------	3.46	3.00	2.05	2.82	3.41
Total Buckwheat No. 1 and smaller	8.89	8.98	7.51	8.37	9.95	5.82	5.51	5.43	5.83	6.87
Total all sizes	11.28	10.90	9.78	10.23	11.67	8.73	7.85	7.98	8.52	9.20

Size	Wyoming region					Sullivan County				
Lump [1] and Broken	$13.73	$12.23	$10.86	$11.30	$13.02	------	------	------	------	------
Egg	13.60	12.25	11.23	12.54	12.89	------	------	------	------	------
Stove	14.77	13.55	12.56	13.38	14.19	$14.29	$13.00	------	------	------
Chestnut	14.89	13.45	12.77	13.39	14.44	14.18	13.00	$10.00	$12.40	$10.93
Pea	11.89	10.85	10.09	10.57	11.75	11.24	11.00	9.00	11.12	10.00
Total Pea and larger	12.91	11.64	10.94	11.45	12.59	12.94	12.07	9.46	11.91	10.56
Buckwheat No. 1	9.98	9.48	8.38	8.62	10.25	6.84	8.00	6.00	------	------
Buckwheat No. 2 (Rice)	8.14	7.75	7.17	7.45	8.93	------	------	4.50	7.21	7.00
Buckwheat No. 3 (Barley)	5.90	5.72	5.50	5.51	6.34	------	3.28	------	5.07	------
Buckwheat No. 4	3.84	4.13	3.92	------	4.34	------	------	------	------	------
Buckwheat No. 5	3.79	3.33	------	3.46	3.84	------	------	------	------	------
Other	2.64	2.58	3.04	2.80	2.33	4.27	------	------	------	------
Total Buckwheat No. 1 and smaller	7.37	6.78	6.58	6.39	7.52	5.00	4.85	4.94	5.99	7.00
Total all sizes	10.08	9.11	8.78	8.77	9.88	8.86	8.59	6.35	10.17	9.25

Size	Total									
	Excluding Sullivan County					Including Sullivan County				
Lump [1] and Broken	$13.77	$12.23	$10.86	$11.32	$13.04	$13.77	$12.23	$10.86	$11.32	$13.04
Egg	13.85	12.58	11.25	12.49	12.85	13.85	12.58	11.25	12.49	12.85
Stove	13.24	11.89	11.33	12.16	12.88	13.24	11.89	11.33	12.16	12.88
Chestnut	14.18	12.66	11.97	12.61	13.43	14.18	12.66	11.97	12.61	13.42
Pea	11.60	10.46	9.86	10.20	11.46	11.59	10.46	9.86	10.20	11.46
Total Pea and larger	12.59	11.27	10.75	11.26	12.32	12.59	11.27	10.75	11.26	12.32
Buckwheat No. 1	9.68	8.92	7.89	8.04	9.84	9.68	8.92	7.88	8.04	9.84
Buckwheat No. 2 (Rice)	7.84	7.53	7.12	7.21	8.76	7.84	7.53	7.10	7.21	8.76
Buckwheat No. 3 (Barley)	5.64	5.53	5.25	5.36	6.18	5.64	5.51	5.25	5.36	6.18
Buckwheat No. 4	3.68	3.62	3.72	3.41	4.19	3.68	3.62	3.72	3.41	4.19
Buckwheat No. 5	3.72	3.32	2.61	3.37	3.76	3.72	3.32	2.61	3.37	3.76
Other	2.98	2.76	3.05	2.86	2.73	3.01	2.76	3.05	2.86	2.73
Total Buckwheat No. 1 and smaller	7.05	6.51	6.29	6.32	7.44	7.05	6.51	6.28	6.32	7.44
Total all sizes	9.81	8.83	8.59	8.77	9.73	9.81	8.83	8.58	8.77	9.73

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[1] Quantity of Lump included is insignificant.

TABLE 26.—Average sales realization per net ton of Pennsylvania anthracite, exclusive of dredge coal, shipped to points outside and inside producing region in 1957, by regions and sizes

(Value does not include margins of separately incorporated sales companies)

Size	Lehigh region			Schuylkill region			Wyoming region		
	Shipped outside region	Local sales	Total	Shipped outside region	Local sales	Total	Shipped outside region	Local sales	Total
Lump [1] and Broken	$14.12	-------	$14.12	$14.67	$13.54	$14.65	$12.88	$13.02	$12.97
Egg	13.12	$12.50	13.10	13.28	13.11	13.27	12.33	12.89	12.34
Stove	13.54	13.45	13.54	12.81	12.52	12.77	12.97	14.19	13.00
Chestnut	13.56	15.10	13.70	12.82	12.50	12.75	13.09	14.44	13.23
Pea	10.39	12.72	10.92	10.36	10.47	10.39	10.42	11.75	11.04
Total Pea and larger	12.76	13.54	12.85	12.28	11.78	12.18	12.60	12.59	12.60
Buckwheat No. 1	9.53	11.20	9.74	9.13	8.95	9.10	9.17	10.25	9.49
Buckwheat No. 2 (Rice)	8.50	10.06	8.92	8.27	8.07	8.23	8.42	8.93	8.57
Buckwheat No. 3 (Barley)	6.48	7.60	6.56	6.38	5.92	6.31	6.30	6.34	6.31
Buckwheat No. 4	5.08	6.24	5.08	4.81	4.16	4.75	4.97	4.34	4.96
Buckwheat No. 5	4.82	3.83	4.81	4.75	3.48	4.71	3.99	3.84	3.90
Other	3.83	-------	3.83	3.81	3.41	3.78	4.19	2.33	3.70
Total Buckwheat No. 1 and smaller	5.75	9.95	6.00	6.28	6.87	6.36	7.19	7.52	7.28
Total all sizes	8.10	11.67	8.37	8.52	9.20	8.63	10.45	9.88	10.33

Size	Sullivan County			Total					
				Excluding Sullivan County			Including Sullivan County		
Lump [1] and Broken	-------	-------	-------	$14.35	$13.04	$13.98	$14.35	$13.04	$13.98
Egg	-------	-------	-------	12.76	12.85	12.76	12.76	12.85	12.76
Stove	-------	-------	-------	12.99	12.88	12.98	12.99	12.88	12.98
Chestnut	$11.00	$10.93	$10.94	13.06	13.43	13.11	13.06	13.42	13.11
Pea	10.00	10.00	10.00	10.39	11.46	10.77	10.39	11.46	10.77
Total Pea and larger	10.49	10.56	10.55	12.50	12.32	12.47	12.50	12.32	12.47
Buckwheat No. 1	-------	-------	-------	9.21	9.84	9.35	9.21	9.84	9.35
Buckwheat No. 2 (Rice)	7.00	7.00	7.00	8.36	8.76	8.46	8.36	8.76	8.46
Buckwheat No. 3 (Barley)	-------	-------	-------	6.37	6.18	6.34	6.37	6.18	6.34
Buckwheat No. 4	-------	-------	-------	4.91	4.19	4.87	4.91	4.19	4.87
Buckwheat No. 5	-------	-------	-------	4.73	3.76	4.64	4.73	3.76	4.64
Other	-------	-------	-------	3.89	2.73	3.78	3.89	2.73	3.78
Total Buckwheat No. 1 and smaller	7.00	7.00	7.00	6.38	7.44	6.55	6.38	7.44	6.55
Total all sizes	8.90	9.25	9.17	9.11	9.73	9.22	9.11	9.73	9.22

[1] Quantity of Lump included is insignificant.

TABLE 27.—Average value per net ton of Pennsylvania anthracite from all sources, 1956–57, by regions [1]

Region	1956				1957			
	Shipped outside region	Local sales	Colliery fuel	Total production	Shipped outside region	Local sales	Colliery fuel	Total production
Lehigh	$7.17	$10.23	$6.25	$7.36	$8.06	$11.67	$7.41	$8.33
Schuylkill	7.27	8.44	5.93	7.43	8.11	9.12	7.20	8.26
Wyoming	9.74	8.77	4.85	9.44	10.42	9.88	5.70	10.21
Total, excluding Sullivan County	8.14	8.74	5.23	8.19	8.89	9.69	6.18	8.99
Sullivan County	6.89	10.17	11.00	8.51	8.90	9.25	11.00	9.18
Grand total	8.14	8.74	5.23	8.19	8.89	9.69	6.18	8.99

[1] Value given for shipments is value at which coal left possession of producing company and does not include margins of separately incorporated sales companies.

TABLE 28.—Retail prices of selected fuels in 1957, by months, for various cities [1]

[Coal per net ton; heating oil, per 100 gallons]

City and fuel	January	February	March	April	May	June	July	August	September	October	November	December
Baltimore, Md.:												
Anthracite:												
Stove	$24.48	$24.48	$24.82	$24.29	$22.68	$22.82	$22.82	$22.82	$22.85	$22.85	$22.85	$22.85
Buckwheat No. 1	19.25	19.25	20.14	20.14	18.87	18.87	18.87	18.87	18.90	18.90	18.90	18.90
Heating oil: Fuel oil No. 2	16.01	16.01	16.01	16.01	15.61	15.53	15.32	14.79	14.79	14.79	14.79	14.79
Boston, Mass.:												
Anthracite:												
Stove	31.50	31.50	31.50	31.50	30.34	30.34	31.09	31.09	31.09	31.50	31.50	31.50
Buckwheat No. 1	24.10	24.10	24.10	24.10	23.72	23.72	24.10	24.10	24.10	24.50	24.50	24.88
Heating oil: Fuel oil No. 2	16.17	16.18	16.18	16.18	15.87	15.68	15.67	15.00	15.00	14.97	15.00	15.00
New York, N. Y.:												
Anthracite:												
Stove	29.10	29.10	29.10	28.14	26.78	26.78	27.29	27.29	27.70	27.70	28.78	28.78
Pea	23.26	23.26	23.26	23.14	22.66	22.66	23.19	23.19	23.58	23.58	24.12	24.12
Buckwheat No. 1	21.42	21.42	21.42	21.38	20.46	20.46	21.44	21.44	21.92	21.92	22.28	22.28
Heating oil: Fuel oil No. 2	16.27	16.27	16.27	16.27	15.90	15.72	15.51	15.18	15.18	15.18	15.18	15.18
Philadelphia, Pa.:												
Anthracite:												
Chestnut	24.95	24.95	24.95	24.95	21.95	21.95	22.62	23.28	23.95	24.95	24.95	25.95
Buckwheat No. 1	19.95	19.95	19.95	19.95	17.95	17.95	18.45	18.62	18.95	19.95	19.95	20.95
Heating oil: Fuel oil No. 2	16.07	16.07	16.07	16.07	15.74	15.55	15.14	14.73	14.73	14.72	14.73	14.73
Washington, D. C.:												
Anthracite:												
Chestnut	27.95	27.95	27.95	27.95	24.89	25.14	26.16	26.93	27.49	28.00	28.00	27.89
Buckwheat No. 1	20.91	20.91	20.91	20.91	19.86	19.99	20.27	20.46	20.81	21.08	21.06	20.97
Heating oil: Fuel oil No. 2	16.42	16.42	16.42	16.42	16.01	15.78	15.50	15.10	15.10	15.10	15.10	15.10

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[1] Compiled from reports of Bureau of Labor Statistics. Prices are as of the 15th of each month. Data are preliminary. Sales tax included where applicable.

EMPLOYMENT

Employment at anthracite operations in 1957, as measured by the average number of men at work daily, totaled 30,825 compared with 31,516 men in 1956. This 2-percent decrease reflects the closing of additional mines as the larger producing companies continued to concentrate output in fewer active units. Owing to the lowered production activity of the industry in 1957, anthracite operations were active 196 days—20 less than in 1956. Likewise, actual worktime declined 11 percent and totaled slightly over 6 million man-days.

Of the industry employment, 45 percent was in the Wyoming region, 40 percent in the Schuylkill, and 15 percent in the Lehigh. The average number of men working in the Wyoming and Lehigh regions declined 10 and 7 percent, respectively, but in the Schuylkill region gained 11 percent over 1956. The increase in the Schuylkill region doubtless resulted from larger employment in the small, independent mines. The geologic lay of the beds in this area is more favorable for such operations than in the other regions. Employment data appear in tables 29 and 30.

The productivity rate of labor in the anthracite industry declined to 4.18 tons per man-day in 1957 slightly below the record of 4.25 tons established in 1956. Productivity advanced in the Lehigh region, declined in the Schuylkill, and was virtually the same as in 1956 in the Wyoming region.

TABLE 29.—**Men employed and days worked at operations producing Pennsylvania anthracite in 1957, by regions**

[Includes operations of strip contractors]

Region	Average number of men working daily				Average number of days plant operated	Man-days of labor	Average tons per man per day
	Under-ground	In strip pits	Other surface	Total			
Lehigh:							
Breaker and washery	1, 952	1, 079	1, 628	4, 659	176	821, 488	5. 40
Dredge	--------	--------	12	12	208	2, 493	12. 29
Total Lehigh	1, 952	1, 079	1, 640	4, 671	176	823, 981	5. 42
Schuylkill:							
Breaker and washery	5, 636	2, 517	4, 174	12, 327	192	2, 371, 757	4. 62
Dredge	--------	--------	115	115	213	24, 535	24. 57
Total Schuylkill	5, 636	2, 517	4, 289	12, 442	193	2, 396, 292	4. 83
Wyoming:							
Breaker and washery	9, 234	945	3, 518	13, 697	207	2, 834, 261	3. 27
Dredge	--------	--------	8	8	152	1, 216	19. 95
Total Wyoming	9, 234	945	3, 526	13, 705	207	2, 835, 477	3. 28
Total, excluding Sullivan County:							
Breaker and washery	16, 822	4, 541	9, 320	30, 683	196	6, 027, 506	4. 09
Dredge	--------	--------	135	135	209	28, 244	23. 29
Total	16, 822	4, 541	9, 455	30, 818	197	6, 055, 750	4. 18
Sullivan County:							
Breaker	--------	5	2	7	194	1, 355	3. 59
Grand total	16, 822	4, 546	9, 457	30, 825	196	6, 057, 105	4. 18

TABLE 30.—Men employed at operations producing Pennsylvania anthracite, 1956–57, by counties

[Includes operations of strip contractors]

County	1956	1957	County	1956	1957
Carbon	1,447	1,391	Luzerne	13,003	11,091
Columbia	974	1,090	Northumberland	2,626	3,075
Dauphin	166	165	Schuylkill	9,134	9,963
Lackawanna	4,053	3,949	Sullivan	7	7
Lancaster, Lebanon, Northampton, and Snyder [1]	106	94	Total	31,516	30,825

[1] Counties producing dredge coal only.

DISTRIBUTION

The methods used in collecting data on the distribution of Pennsylvania anthracite differ from those employed in gathering information on production. Production is measured at the preparation plant, and it is necessary to contact only producers. However, distribution data are collected not only from producers but from wholesalers, sales agents, dock operators, and exporters, because frequently only these latter concerns know the final destinations of the coal shipments. Other differences are (1) that distribution data are obtained on all shipments, whether made from current production or from stocks held in ground storage (whereas production data include only those tonnages placed into inventory) and (2) that the coal year (April 1–March 31) is used, since it more nearly coincides with the normal heating season than the calendar year. For these reasons, the reader should not attempt to correlate these two groups of data.

The distribution data published by the Bureau of Mines cover rail shipments, by individual sizes, to approximately 353 cities in 20 States and Provinces. Data are compiled on truck shipments only by State of destination. Generally, the larger part of the coal shipped by truck or sold for consumption in the producing region is reported by the producing companies, which also supply tonnages handled by each wholesaler, dock operator, or exporter. As every firm engaged in the sale of anthracite is requested to furnish complete destination data on all coal purchased from, or handled for the account of, producing companies, the close crosschecking possible provides not only an effective method for tracing coal shipments to final markets—whether moving all-rail, rail-lake, rail-tidewater, or exdock rail—but an accurate measurement of the coverage obtained. Copies of these reports may be obtained by writing the United States Bureau of Mines, Washington 25, D. C.

Shipments of Pennsylvania anthracite reported to the Bureau of Mines totaled 27,941,000 net tons for the 1956–57 coal year, an increase of 5 percent over the preceding year. (See table 31.) Of the total, 80.7 percent was shipped to points in the United States, 7.5 percent to Canada, and 11.8 percent to overseas destinations. The 1956–57 coal-year figures indicate a decline of 3.5 percent in shipments to American markets and 8.5 percent in exports to Canada. However, because of an expanded demand in some western European countries, exports to non-Canadian destinations climbed 302 percent over the 1955–56 coal-year level.

TABLE 31.—Distribution of Pennsylvania anthracite, April 1, 1956, to March 31, 1957, by States, Provinces, and countries of destination, in net tons

Destinations	Pea and larger						Buckwheat No. 1 and smaller					Total all sizes	Percent of total
	Broken	Egg	Stove	Chestnut	Pea	Total	Buckwheat No. 1	Buckwheat No. 2 (Rice)	Buckwheat No. 3 (Barley)	All other sizes	Total		
United States:													
New England States:													
Connecticut	------	2,197	93,800	108,989	8,924	213,910	24,076	18,980	15,141	2,476	60,673	274,583	0.98
Maine	------	3,296	54,390	47,714	1,576	106,976	9,977	10,793	------	1,258	22,028	129,004	.46
Massachusetts	600	43,809	413,865	197,582	16,749	672,605	64,903	57,313	21,388	33,126	176,730	849,335	3.04
New Hampshire	------	2,770	40,750	25,533	1,682	70,735	9,881	12,042	29,714	1,427	53,064	123,799	.45
Rhode Island	------	2,436	37,506	26,968	1,948	68,858	8,214	6,370	------	266	14,850	83,708	.30
Vermont	138	1,878	48,842	32,622	7,285	90,765	22,829	23,952	50	83	46,914	137,679	.49
Total	738	56,386	689,153	439,408	38,164	1,223,849	139,880	129,450	66,293	38,636	374,259	1,598,108	5.72
Middle Atlantic States:													
New Jersey	1,497	13,776	302,114	744,992	239,484	1,301,863	275,487	278,373	665,744	512,489	1,732,093	3,033,956	10.86
New York	784	93,748	1,112,515	991,490	774,884	2,973,421	1,329,867	500,173	531,052	810,501	3,171,593	6,145,014	21.99
Pennsylvania [1]	45,308	27,383	674,350	1,544,219	1,515,868	3,807,128	1,124,954	1,138,106	1,501,068	2,368,506	6,132,634	9,939,762	35.58
Total	47,589	134,907	2,088,979	3,280,701	2,530,236	8,082,412	2,730,308	1,916,652	2,697,864	3,691,496	11,036,320	19,118,732	68.43
South Atlantic States: [2]													
Delaware	2,969	637	24,648	74,387	3,891	106,532	3,691	2,238	12,008	3,643	21,580	128,112	.46
District of Columbia	------	2,459	21,951	28,146	2,452	55,008	16,226	1,162	696	743	18,827	73,835	.26
Maryland	662	4,308	81,646	94,477	15,763	196,856	35,681	6,903	211	136,645	179,440	376,296	1.35
Virginia	------	458	12,707	21,434	1,048	35,647	6,430	47	10	457	6,944	42,591	.15
Total	3,631	7,862	140,952	218,444	23,154	394,043	62,028	10,350	12,925	141,488	226,791	620,834	2.22
Lake States: [3]													
Illinois	------	666	8,397	17,099	25,751	51,913	39,144	14,446	8,055	9,924	71,569	123,482	.44
Michigan	------	1,946	28,189	17,381	1,219	48,735	4,574	8,685	24	72,272	85,555	134,290	.48
Minnesota	------	------	1,733	2,490	133	4,356	34	------	------	141,525	141,559	145,915	.52
Ohio	------	1,415	2,165	9,098	17,020	29,698	32,503	7,789	2,081	135,140	177,513	207,211	.74
Wisconsin	------	20	46,730	70,074	6,689	123,513	8,407	4,084	------	240,132	252,623	376,136	1.35
Total	------	4,047	87,214	116,142	50,812	258,215	84,662	35,004	10,160	598,993	728,819	987,034	3.53
All other States	2,443	589	2,272	16,925	385	22,614	27,229	3,885	9,419	159,746	200,279	222,893	.80
Total United States	54,401	203,791	3,008,570	4,071,620	2,642,751	9,981,133	3,044,107	2,095,341	2,796,661	4,630,359	12,566,468	22,547,601	80.70

Canada:													
Ontario	----------	37, 033	744, 974	508, 028	37, 441	1, 327, 476	66, 571	60, 924	22, 710	6, 921	157, 126	1, 484, 602	5. 31
Quebec	----------	6, 646	146, 765	84, 032	5, 090	242, 533	125, 695	77, 027	73, 535	38, 360	314, 617	557, 150	2. 00
Other Provinces	670	8, 120	21, 325	15, 743	946	46, 804	6, 191	11, 179	394	3, 396	21, 160	67, 964	. 24
Total Canada	670	51, 799	913, 064	607, 803	43, 477	1, 616, 813	198, 457	149, 130	96, 639	48, 677	492, 903	2, 109, 716	7. 55
Other countries	11, 310	62, 002	274, 417	697, 335	438, 473	1, 483, 537	347, 900	192, 858	297, 917	961, 148	1, 799, 823	3, 283, 360	11. 75
Grand total	66, 381	317, 592	4, 196, 051	5, 376, 758	3, 124, 701	13, 081, 483	3, 590, 464	2, 437, 329	3, 191, 217	5, 640, 184	14, 859, 194	27, 940, 677	100. 00

[1] Includes "local sales."

[2] Shipments to other states generally referred to as being in the South Atlantic area are included in "All other States."

[3] Shipments to Indiana are included in "All other States."

Shipments reported to American markets for the 1955–56 and 1956–57 coal years reveal rather wide variations in State and area demands. Although shipments to the New England States fell about 12 percent under the 1955–56 coal-year level, the percentages of decline ranged from 8 and 9 percent in Vermont and Massachusetts, respectively, to 17 and 21 percent in Connecticut and Rhode Island. In the Middle Atlantic States shipments to New York and New Jersey were approximately 9 percent less than in the 1955–56 coal year, whereas the Commonwealth of Pennsylvania gained 2 percent. In the South Atlantic area, the comparisons range from an increase of 2 percent in Maryland to losses of 31, 16, and 14 percent in Virginia, the District of Columbia, and Delaware, respectively. The only area to show a net increase was the Lake States, where each State except Michigan showed a material increase over 1955–56 coal-year receipts.

In Canada the Province of Ontario imported 14.5 percent less Pennsylvania anthracite than in the 1955–56 coal year; however, the Maritimes and the Province of Quebec increased imports 26 and 8 percent, respectively. The Netherlands, France, Belgium, and Italy, in order, were the leading European importers, accounting for about 91 percent of the anthracite exported overseas during the 1956–57 coal year. As a large part of the anthracite imported by the Netherlands is transshipped to other European countries, the data shown in table 32 are not indicative of the amount actually imported for internal consumption.

A total of 7,814,000 tons of anthracite was shipped to market by truck during the 1956–57 coal year (an increase of 3 percent), while 20,126,000 tons was reported as rail shipments, a net gain of 6 percent. Size data reported for the 1956–57 coal year indicate that total shipments of Pea and larger sizes increased approximately 1 percent while Buckwheat No. 1 and smaller gained 10 percent. Of the small sizes, Buckwheat No. 4 and smaller registered the sharpest increase—21 percent. The size data by countries show that shipments of Pea and larger declined 9 percent in the United States and 14 percent in Canada, whereas shipments of Buckwheat No. 1 and smaller increased 2 percent in the United States and 14 percent in Canada.

Distribution data published monthly by the Pennsylvania Department of Mines and Mineral Industries show that during calendar year 1957, 16,080,000 tons of anthracite were shipped to market by rail and 8,366,000 tons by truck (see tables 33 and 34). According to these data, the total moved by truck exceeded the 1956 volume by slightly more than 1 percent despite the overall decline in output, while rail tonnage declined 14 percent. The gain in truck movement was due primarily to increases of 2 and 4 percent, respectively, in deliveries to Pennsylvania and New York—both major trucking markets—as shipments declined to New Jersey, Maryland, District of Columbia, and other States. Declines in the rail movement of anthracite to major markets ranged between 2 percent in Pennsylvania to 24 percent in New Jersey, with the New England States showing a decline of 18 percent; New York, 22 percent; Delaware, 20 percent; and, the District of Columbia, 41 percent. Rail shipments to Canada were approximately 24 percent below the 1956 level.

TABLE 32.—Exports of Pennsylvania anthracite to countries other than Canada during the coal year April 1, 1956–March 31, 1957

Destination	Pea and larger					
	Broken	Egg	Stove	Chestnut	Pea	Total
North and Central America:						
Bermuda, Cuba, Mexico, and Jamaica	169	387	----------	156	----------	712
South America:						
Argentina, Brazil, and Uruguay	----------	----------	----------	8,118	4,420	12,538
Europe:						
Belgium and Luxembourg	1,964	12,290	78,995	218,829	83,247	395,325
France	9,177	23,190	21,533	2,253	----------	56,153
Italy	----------	----------	51,518	53,269	1,929	106,716
Netherlands	----------	10,551	91,861	408,682	343,270	854,364
Finland, Germany (West), Greece, Norway, and Switzerland	----------	15,584	30,510	6,028	4,756	56,878
Total	11,141	61,615	274,417	689,061	433,202	1,469,436
Asia:						
Israel, Japan, and Viet-Nam	----------	----------	----------	----------	851	851
Grand total	11,310	62,002	274,417	697,335	438,473	1,483,537

Destination	Buckwheat No. 1 and smaller					Total all sizes
	Buckwheat No. 1	Buckwheat No. 2 (Rice)	Buckwheat No. 3 (Barley)	All other sizes	Total	
North and Central America:						
Bermuda, Cuba, Mexico, and Jamaica	70,157	----------	----------	6,044	76,201	76,913
South America:						
Argentina, Brazil, and Uruguay	465	4,377	----------	----------	4,842	17,380
Europe:						
Belgium and Luxembourg	30,916	----------	23,370	29,391	83,677	479,002
France	104	37,877	203,721	679,281	920,983	977,136
Italy	18,896	31,654	9,287	45,702	105,539	212,255
Netherlands	168,728	117,859	57,490	136,624	480,701	1,335,065
Finland, Germany (West), Greece, Norway, and Switzerland	7,810	1,091	4,049	55,516	68,466	125,344
Total	226,454	188,481	297,917	946,514	1,659,366	3,128,802
Asia:						
Israel, Japan, and Viet-Nam	50,824	----------	----------	8,590	59,414	60,265
Grand total	347,900	192,858	297,917	961,148	1,799,823	[1] 3,283,360

[1] According to data released by the Bureau of the Census, U. S. Department of Commerce, 3,269,056 net tons of anchracite were exported to non-Canadian destinations during the 1956–57 coal year.

New England receipts of anthracite continued to decline in 1957 according to data released by the Massachusetts Division on the Necessaries of Life, as rail shipments fell 22 percent below the 1956 volume and the tidewater movement totaled only about 3,000 net tons. There were no imports of anthracite reported for the New England States in 1957. (See tables 2 and 35.)

According to the Ore and Coal Exchange, Cleveland, Ohio, loadings of Pennsylvania anthracite over Lake Erie docks fell 23 percent in 1957 after increasing sharply in 1956. This decline was accompanied by decreases of 16 percent in receipts at Duluth-Superior; Lake Superior, 38 percent; and Lake Michigan, 27 percent. Reloadings for

TABLE 33.—Rail shipments of Pennsylvania anthracite, 1954–57, by destinations, in net tons [1]

[Pennsylvania Department of Mines and Mineral Industries]

Destination	1954	1955	1956	1957
New England States	1, 809, 622	1, 771, 427	1, 574, 898	1, 287, 632
New York	5, 646, 750	5, 411, 825	4, 793, 285	3, 723, 217
New Jersey	3, 169, 972	2, 849, 526	2, 529, 223	1, 927, 658
Pennsylvania	4, 999, 277	4, 381, 062	4, 735, 222	4, 622, 699
Delaware	152, 644	138, 733	108, 308	86, 231
Maryland	250, 372	257, 795	277, 378	293, 316
District of Columbia	87, 690	73, 543	66, 121	39, 244
Virginia	56, 663	59, 094	37, 992	28, 207
Ohio	118, 520	300, 246	417, 813	251, 585
Indiana	29, 545	41, 660	51, 692	24, 427
Illinois	96, 928	107, 852	115, 143	133, 817
Wisconsin	161, 271	145, 939	128, 753	103, 155
Minnesota	11, 646	22, 024	21, 965	89, 023
Michigan	80, 566	75, 239	83, 907	52, 718
Other States	156, 176	129, 210	133, 495	165, 434
Total United States	16, 827, 642	15, 765, 175	15, 075, 195	12, 828, 363
Canada	2, 271, 981	2, 203, 474	2, 091, 718	1, 588, 304
Other foreign countries	250, 808	388, 621	1, 567, 842	1, 663, 819
Grand total	19, 350, 431	18, 357, 270	18, 734, 755	16, 080, 486

[1] Does not include dredge coal.

TABLE 34.—Truck shipments of Pennsylvania anthracite in 1957, by months and by States of destination, in net tons [1]

Destination	January	February	March	April	May	June	July
Pennsylvania:							
Within region	587, 118	446, 294	380, 738	462, 385	386, 337	294, 049	196, 009
Outside region	232, 545	173, 598	133, 557	153, 501	147, 384	170, 537	121, 262
New York	140, 084	119, 509	76, 567	89, 787	95, 968	101, 221	61, 337
New Jersey	84, 506	61, 189	41, 310	62, 855	56. 523	69, 451	38, 629
Delaware	5, 891	3, 839	2, 694	1, 755	2, 031	1, 708	1, 063
Maryland	11, 367	8, 374	5, 633	3, 709	2, 300	2, 250	2, 251
District of Columbia	356	212	204	458	204	205	238
Other States	1, 421	604	456	474	451	1, 260	208
Total: 1957	1, 063, 288	813, 619	641, 159	774, 924	691, 198	640, 681	420, 997
1956	942, 179	720, 342	803, 064	739, 923	625, 020	578, 731	465, 182

Destination	August	September	October	November	December	Total	Percent of total trucked
Pennsylvania:							
Within region	283, 882	251, 710	330, 685	352, 758	424, 452	4, 396, 417	52. 5
Outside region	190, 817	154, 779	188, 433	165, 959	173, 657	2, 006, 029	24. 0
New York	110, 282	93, 633	99, 735	84, 154	98, 081	1, 170, 358	14. 0
New Jersey	60, 651	50, 905	56, 299	46, 438	53, 236	681, 992	8. 2
Delaware	2, 638	1, 427	3, 000	3, 268	4, 138	33, 452	. 4
Maryland	4, 798	2, 542	7, 635	6, 610	7, 829	65, 298	. 8
District of Columbia	253	27	167	427	49	2, 800	(2)
Other States	789	602	770	1, 064	1, 475	9, 574	. 1
Total: 1957	654, 110	555, 625	686, 724	660, 678	762, 917	8, 365, 920	100. 0
1956	565, 324	681, 298	719, 587	718, 066	693, 631	8, 252, 347	100. 0

[1] Compiled from reports of Pennsylvania Department of Mines and Mineral Industries; does not include dredge coal.

[2] Less than 0.05 percent.

inland shipment also showed substantial declines for both Lake Superior and Lake Michigan. Loadings over Lake Ontario docks again totaled less than 1,000 tons for the shipping season (April through November). Table 2 provides detailed data on the Lake movement of anthracite.

TABLE 35.—Receipts of anthracite in New England, 1917, 1920, 1923, 1927, and 1942–57, in thousand net tons

Year	Receipts by tidewater	Receipts by rail[1]	Imports[2]	Total receipts of Pennsylvania anthracite[3]	Year	Receipts by tidewater[4]	Receipts by rail[1]	Imports[2]	Total receipts of Pennsylvania anthracite[3]
1917	[1] 4,421	7,259	1	11,679	1948	217	4,646	----------	4,863
1920	[1] 3,521	7,804	1	11,324	1949	110	3,336	----------	3,446
1923	[1] 4,082	8,102	145	12,039	1950	81	3,615	18	3,678
1927	[1] 2,421	6,725	106	9,040	1951	66	3,135	27	3,174
1942	[4] 581	5,393	139	5,835	1952	70	2,847	29	2,888
1943	[4] 575	5,310	164	5,721	1953	49	2,088	31	2,106
1944	[4] 398	5,836	12	6,222	1954	10	1,893	6	1,897
1945	[4] 331	4,750	(5)	5,081	1955	5	1,713	(5)	1,718
1946	[4] 399	5,244	----------	5,643	1956	10	1,610	(5)	1,620
1947	[4] 240	4,498	----------	4,738	1957	3	1,262	----------	1,265

[1] Commonwealth of Massachusetts, Division on the Necessaries of Life.
[2] U. S. Department of Commerce.
[3] Total receipts by rail and by tidewater less imports.
[4] Association of American Railroads.
[5] Less than 500 tons.

CONSUMPTION

The apparent consumption of Pennsylvania anthracite (production, plus imports, minus exports, and changes in producers' stocks) in the United States totaled 20.8 million tons in 1957—a decline of approximately the same order as total production. Although production and consumption data cannot be correlated closely, the decline of 3.6 million tons in production between 1956 and 1957 was accompanied by a decrease of 2 million tons in the primary markets of the New England, Middle Atlantic, and South Atlantic States (see table 36) and 900,000 tons in total exports.

Also of significance were Bureau of Mines data which indicated that deliveries by retail dealers (outside the "local sales" area) were 18 percent below the 1956 volume while the tonnage loaded for movement over the Great Lakes declined almost one-fourth. The abrupt decline in the tonnage handled by retailers was caused by the recurrence of warmer-than-normal weather in the major anthracite market areas and continued losses to competitive fuels in the space-heating field. Some cause for optimism could be found however, as the finer sizes of anthracite continued to show relatively greater market strength than the larger coals. Consumption by public utilities moved up 2 percent and, although largely unknown, the consumption of small sizes for industrial purposes apparently remained fairly steady since the production of Buckwheat No. 4 and smaller sizes decreased 1 percent.

In 1957, 389,000 tons of Pennsylvania anthracite were used as an admix with bituminous coal in cokemaking—a gain of 3 percent over 1956 compared with a 2-percent increase in total coke output. The tonnage of anthracite consumed by class I railroads and by briquet manufacturers fell substantially below 1956. In 1957, consumption reported by railroads totaled 361,000 tons, or 12 percent less, while 156,000 were used in manufacturing briquets as compared with 228,000 tons in 1956.

A comparatively new market for anthrafines has been developed in recent years for pelletizing and sintering iron-ore fines. To measure the extent of this market, the Bureau of Mines for the first time requested pig-iron and iron-ore producers to submit data on the quantity of anthracite used in such agglomerating operations during 1957. As a result, reports were received showing that 885,000 tons of anthrafines were used in 1957 in making pellets and sinter at 21 individual plants. Almost the entire amount of anthracite reported was consumed in Maryland, Minnesota, New York, and Pennsylvania.

Detailed data on the apparent consumption of anthracite, briquets, domestic coke, heating and range oils, and natural gas in the primary anthracite marketing areas are shown in table 36. Monthly consumption data for public utilities and railroads will be found in table 2.

TABLE 36.—Apparent consumption of anthracite and selected competitive fuels in the principal anthracite markets, 1954–57

(Thousand net tons)

Fuel	New England	New York	New Jersey	Pennsylvania	Delaware	Maryland	District of Columbia	Total	Percent of total fuels
Anthracite (all users):[1]									
1954	1,809	[2] 6,361	[2] 3,743	10,878	169	320	90	23,370	21.6
1955	1,771	[2] 6,359	[2] 3,602	10,618	157	328	81	22,916	19.9
1956	1,575	[2] 5,923	[2] 3,255	11,010	137	355	70	22,325	18.5
1957	1,288	[2] 4,893	[2] 2,610	11,025	120	358	42	20,336	17.3
Imported:[3]									
1954	6	--------	--------	--------	--------	--------	--------	6	(4)
1955	(5)	--------	--------	--------	--------	--------	--------	(5)	(4)
1956	(5)	--------	--------	--------	--------	--------	--------	(5)	(4)
1957	--------	--------	--------	--------	--------	--------	--------	--------	--------
Briquets (domestic use):									
1954	21	8	8	13	--------	9	1	60	.1
1955	19	6	1	10	(5)	7	1	44	(4)
1956	17	6	1	9	(5)	6	1	40	(4)
1957	12	4	1	7	(5)	5	1	30	(4)
Coke (domestic use):									
1954	379	179	241	102	(5)	(5)	--------	901	.8
1955	384	122	235	96	(5)	--------	--------	837	.7
1956	334	70	202	87	(5)	--------	--------	693	.6
1957	221	58	162	57	(5)	(5)	--------	498	.4
Imported:[3]									
1954	1	1	--------	--------	--------	--------	--------	2	(4)
1955	2	3	--------	--------	--------	--------	--------	5	(4)
1956	7	12	--------	--------	--------	--------	--------	19	(4)
1957	(5)	12	--------	--------	--------	--------	--------	12	(4)
Oil (heating and range):[6]									
1954	23,199	18,051	9,034	8,030	725	3,897	1,217	64,153	59.2
1955	24,564	[7] 19,903	9,808	8,810	812	4,234	1,284	[7] 69,415	60.2
1956	25,789	20,402	10,253	9,186	911	4,617	1,317	72,475	60.2
1957	24,807	19,820	10,112	9,090	903	4,559	1,287	70,578	60.0
Natural gas:[8]									
1954	1,604	7,045	1,608	7,824	(9)	(9)	[9] 1,784	19,865	18.3
1955	1,873	7,761	1,971	8,518	(9)	(9)	[9] 1,965	22,088	19.2
1956	2,252	8,633	2,366	9,382	(9)	(9)	[9] 2,243	24,876	20.7
1957	2,455	9,095	2,544	9,872	(9)	(9)	[9] 2,328	26,294	22.3
Total:									
1954	27,019	31,645	14,634	26,847	[10] 894	[10] 4,226	[10] 3,092	108,357	100.0
1955	28,613	[7] 34,154	15,617	28,052	[10] 969	[10] 4,569	[10] 3,331	[7] 115,305	100.0
1956	29,974	35,046	16,077	29,674	[10] 1,048	[10] 4,978	[10] 3,631	120,428	100.0
1957	28,783	33,882	15,429	30,051	[10] 1,023	[10] 4,922	[10] 3,658	117,748	100.0

[1] Pennsylvania Department of Mines.

[2] An important but undetermined part of anthracite shown as shipped to New Jersey is reshipped to New York City.

[3] U. S. Department of Commerce.

[4] Less than 0.05 percent.

[5] Less than 500 tons.

[6] Converted to coal equivalent upon basis of 4 barrels of fuel oil equaling 1 ton of coal.

[7] Revised.

[8] Converted to coal equivalent upon basis of 24,190 cubic feet of natural gas equaling 1 ton of coal.

[9] Delaware and Maryland included with District of Columbia.

[10] Natural gas for Delaware and Maryland included with District of Columbia.

STOCKS

After dropping in 1956 to the lowest December figure (342,000 tons) since 1946, the quantity of anthracite held in ground storage by producers climbed in 1957 and totaled 500,000 tons at the close of the year. The build-up in producers' stocks during the year undoubtedly was due to curtailed demand for the larger sizes in both Europe and the United States and the relatively stronger demand for the smaller sizes in both areas. This assumption is confirmed by the fact that, of the total reported in ground storage by the Anthracite Committee at the end of December, approximately 403,000 tons was Pea and larger sizes and less than 6,000 tons was Barley and smaller.

Anthracite stocks held in retail yards in the United States (excluding the "local sales" area) at the end of 1957 were estimated by the Bureau of Mines at 1,301,000 tons—13 percent less than on the same date in 1956. This decline apparently was due primarily to two factors: First, the decline of 18 percent between 1956 and 1957 in deliveries from retail yards to consumers; and second, the fact that retail dealers stocked rather heavily in the latter months of 1956 for possible recurrence of the abnormally cold winter of 1955–56. When severe weather conditions failed to materialize during the 1956–57 heating season, the retail trade moved these yard stocks only with difficulty during the early months of 1957 by curtailing purchases from the mines. As a result of this experience, the trade apparently preferred to keep retail stocks at a lower level while awaiting weather developments during the 1957–58 season.

The inventory position of public utilities changed little during the year, as the total quantity of anthracite in stock at electric-utility plants at the end of the year (2,798,000 tons) was virtually the same as at the end of 1956. Because consumption by public utility plants was only 2 percent over the 1956 level, the utilities obviously succeeded to a marked degree in gearing consumption requirements to purchases and receipts, with stockpiles playing only a minor role in the overall supply pattern.

Anthracite stocks held by class I railroads at the close of 1957 totaled 33,000 tons—24 percent below the same date of 1956. Combined loadings at Lake Erie and Ontario docks for Upper Lake shipment fell about 23 percent. As stocks at Lake Michigan and Lake Superior docks declined 33 and 10 percent, respectively, apparently the demand for anthracite was stronger in the Upper Lake area than the loading data alone would indicate.

FOREIGN TRADE[1]

According to the United States Department of Commerce, no anthracite was imported into the eastern part of the country in 1957. The 1,138 tons, shown in table 37, imported into the State of Washington from Canada, is thought to have been bituminous coal from the Province of Alberta, as the Dominion Bureau of Statistics did not report production of any true anthracite in Canada in 1957.

Total exports of anthracite declined 17 percent in 1957; but, even at this reduced rate, the export market, as in 1956, took about 1 ton

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[1] Figures on imports and exports compiled by Mae B. Price and Elsie D. Jackson, Division of Foreign Activities, Bureau of Mines, from records of the Bureau of the Census.

TABLE 37.—Anthracite imported for consumption in the United States, 1956–57, by countries and customs districts, in net tons

[Bureau of the Census]

Country	1956	1957
North America: Canada	46	1,138
Total	46	1,138

Customs district	1956	1957
Maine and New Hampshire	46	--------
Washington	--------	1,138
Total	46	1,138

of each 6 tons produced. While declines occurred in both the European and Canadian markets, the drop in shipments to Canada was the most abrupt in recent years. In 1957 only 1,779,000 tons was shipped to that country, compared with 2,356,000 tons in 1956—a decrease of approximately 25 percent. Although weather conditions in most Canadian anthracite markets were generally warmer than normal, the sharp break in Canadian demand for anthracite probably could be attributed more to competition from other fuels. Pennsylvania anthracite has competed in Ontario, Quebec, and the Maritimes with Welsh anthracite and fuel oil for many years; however, the effect upon Canadian fuel markets of a relatively new competitor, natural gas, is becoming increasingly apparent. According to export data of the Bureau of the Census, United States Department of Commerce, natural gas exported from the United States to the Province of Ontario in 1956 totaled 16.8 billion cubic feet (equivalent to approximately 685,000 tons of coal). In 1957, the volume climbed to 26.6 billion cubic feet, or about the equivalent of 1,083,000 tons. When the trans-Canada pipeline finally is completed to Ontario, with future extensions into Quebec, the flow from the United States is expected to cease and, possibly, be reversed to provide some American markets with Canadian gas. As the eastward flow of Canadian gas ultimately will far exceed the quantities imported from the United States, the Pennsylvania anthracite industry undoubtedly will encounter difficulty in retaining its present share of the fuel market of eastern Canada.

Shipments of Pennsylvania anthracite to Europe were 368,000 tons (14 percent) below the 2,723,000 tons of 1956. Prospects for 1958 do not appear bright, as the substantial coal stocks carried over from the 1956–57 heating season and competition from Russian anthracite pointed to decreased demand for American anthracite in Europe. In 1957 France displaced the Netherlands as the largest European importer of Pennsylvania anthracite, followed in order by that country, Italy, Belgium-Luxembourg, Greece, and West Germany. However, as France had large stocks of coal on hand at the close of the year and has an agreement with the U. S. S. R. calling for the importation of approximately 750,000 metric tons of anthracite in 1958, it is expected that 1958 purchases of Pennsylvania anthracite by France will be reduced rather sharply and confined almost entirely to the finer sizes.

According to data published in the Coal Market Review, May 28, 1958, the Economic Commission for Europe, Geneva, Russia exported more anthracite to Europe in 1957 than in the preceding year. Although shipments to France and Italy varied little (the former taking

605,000 metric tons compared with 623,000 tons in 1956 and the latter, 211,000 tons compared with 219,000 tons) Belgium-Luxembourg and the Netherlands received substantially less. The Netherlands reduced imports of Russian anthracite from 129,000 metric tons in 1956 to 40,000 tons in 1957 and Belgium-Luxembourg from 62,000 tons to 44,000. Exports to Finland increased from 143,000 metric tons in 1956 to 199,000, but exports to East Germany climbed from 149,000 tons to 442,000.

Export data released in the Accounts Relating to the Trade and Navigation of the United Kingdom, and republished by the Bureau of Mines in the International Coal Trade bulletin, indicate little change in British exports of anthracite, as the total for 1957 (1,645,000 metric tons) exceeded 1956 by only 11,000 tons. As British exports to Canada totaled only 118,000 metric tons, down approximately 19 percent from 1956, it appeared that British exports to Western Europe were slightly higher for the year. Table 38 provides detailed data on exports of Pennsylvania anthracite for 1956 and 1957 by countries of destination and custom districts, and table 37 on imports into the United States, by customs districts and countries of origin.

TABLE 38.—Anthracite exported from the United States, 1956–57, by countries and customs districts, in net tons

[Bureau of the Census]

Country	1956	1957
North America:		
Bermuda	110	17
Canada	2, 356, 351	1, 778, 551
Cuba	69, 575	101, 456
Jamaica	290	------
Mexico	428	1, 134
Trinidad and Tobago	100	------
Total	2, 426, 854	1, 881, 158
South America:		
Argentina	7, 579	3, 773
Bolivia	24	------
Brazil	10, 352	7, 270
Peru	60	9
Uruguay	537	------
Venezuela	------	10
Total	18, 552	11, 062
Europe:		
Belgium-Luxembourg	326, 828	243, 048
Finland	10, 905	------
France	860, 961	1, 035, 628
Germany, West	97, 872	15, 042
Greece	36, 372	42, 043
Italy	194, 202	257, 765
Netherlands	1, 175, 931	761, 891
Norway	10, 713	------
Switzerland	9, 627	------
United Kingdom	20	------
Total	2, 723, 431	2, 355, 417
Asia:		
Indonesia	------	107
Israel	12, 493	33, 305
Japan	15, 497	25, 547
Viet-Nam, Laos, and Cambodia	47, 522	25, 189
Total	75, 512	84, 148
Grand total	5, 244, 349	4, 331, 785

Customs district	1956	1957
North Atlantic:		
Connecticut	124	------
Maine and New Hampshire	188	18
Massachusetts	107	------
New York	12, 030	2, 567
Philadelphia	2, 876, 839	2, 542, 531
South Atlantic:		
Maryland	504	17
Virginia	1, 194	610
Gulf coast:		
New Orleans	204	------
Sabine	382	------
Mexican border: Laredo	423	1, 104
Pacific coast:		
Los Angeles	5	------
Oregon	------	10, 016
Washington	------	11
Northern border:		
Buffalo	1, 188, 413	1, 080, 238
Dakota	105	40
Duluth and Superior	11, 071	3, 349
Michigan	793	4, 735
Montana and Idaho	31	------
Ohio	16, 360	9. 127
Rochester	697	760
St. Lawrence	556, 142	650, 100
Vermont	30, 837	21, 922
Miscellaneous[1]	547, 900	4, 640
Total	5, 244, 349	4, 331, 785

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[1] District breakdown not available.

WORLD PRODUCTION

World production of anthracite totaled approximately 158,000,000 net tons in 1957—a net gain of about 1 percent. Of the major anthracite-producing countries, the most marked changes occurred in the United States and Belgium, the former showing a loss of 12 percent and the latter an increase of 28 percent. The U. S. S. R. increased output almost 1 million tons, but the gain was only 1 percent over 1956 production. Other countries showing sizable percentage increases, but of less absolute value, were France, Japan, Republic of Korea, Spain, and Portugal. Other than the United States, the only important producing country to report a decline was the United Kingdom, where the 1957 output fell about 4 percent below 1956.

Table 39, which presents detailed data on world production of anthracite for 1953–57, includes, for the first time, statistics for Union of South Africa. These figures, however, are based on coal sales and hence are less than the total output since colliery fuel, employee coal, and changes in stocks are factors that undoubtedly have not been considered.

TABLE 39.—World production of anthracite, 1953–57, by countries, in thousand short tons [1]

[Compiled by Pearl J. Thompson]

Country	1953	1954	1955	1956	1957
Belgium	7,893	7,781	7,947	7,675	9,827
Bulgaria	[2] 33	[2] 33	132	137	[2] 150
China [2]	4,400	5,000	5,000	5,500	5,700
France	10.950	11,894	12,031	12,033	12,395
Germany:					
East [2]	270	270	275	275	275
West	10,692	11,556	12,378	13,453	13,338
Ireland	127	170	154	171	180
Italy	75	71	53	60	61
Japan	1,215	1,376	1,495	1,559	1,855
Korea:					
North [2]	1,100	1,200	1,300	1,500	1,600
Republic of	956	982	1,442	2,003	2,691
Morocco: Southern Zone	623	536	515	531	574
New Zealand	2	2	2	2	[2] 2
Peru	76	86	18	18	8
Portugal	527	476	445	456	549
Rumania	[2] 55	[2] 55	22	12	[2] 17
Spain	2,150	2,165	2,159	2,507	3,010
Switzerland [2]	11	11	11	11	11
Union of South Africa [3]	471	428	413	[2] 465	[2] 485
U. S. S. R.	54,235	58,324	66,974	[2] 73,100	[2] 73,900
United Kingdom	4,705	5,013	4,894	4,662	4,476
United States (Pennsylvania)	30,949	29,083	26,205	28,900	25,338
Viet-Nam:					
North	978	1,099	1,213	1,213	[2] 1,200
South	---------	---------	---------	2	13
World total (estimate) [1]	132,500	137,600	145,100	156,200	157,700

[1] This table incorporates a number of revisions of data published in previous Anthracite chapters. Data do not add to totals shown owing to rounding where estimated figures are included in the detail.

[2] Estimate.

[3] Reported as sales.

NOTE: An undetermined quantity of semianthracite is included in the figures for some countries.

TECHNOLOGY

A coordinated research program on extraction and processing of anthracite has primary importance in rebuilding of the industry. Mining investigations are directed toward lowering costs, improving safety of mining operations, raising the percentage of recovery of the deposits, and adding to basic knowledge on mining technology. The objectives of research on preparation and utilization of anthracite are to improve quality, reduce costs, expand current uses, and develop new ones.

Mining.—Final plans and arrangements were completed by an anthracite producer and the Bureau of Mines to establish a fully mechanized longwall mining system with mechanized roof support and controlled caving. The project is in a moderately pitching (12°–21°) bed of coal 7 feet thick. The block of coal to be worked measures 400 feet wide by 1,200 feet long. Three types of mining machinery will be tested on the 400-foot longwall face. In the first method the coal will be undercut with conventional chain-cutting machines, drilled and blasted, and loaded onto a conveyor by a coal plough. The second demonstration will employ the Bureau's vibrating-blade planer, which shears 4 to 6 inches of coal from the face and loads the coal on the conveyor. In the third stage an Anderton-type, drum cutter-loader of German manufacture will be used to cut a 24-inch slice of coal from the face and load the coal in a continuous operation. Mechanized roof support and caving will be controlled through the use of yielding steel props and steel crib bases fitted with crib releases.

After modification by removal of the shaker drive and the rear suspension bridge, the Bureau-designed scraper-shaker-loader was tested in driving a rock slope from the surface to open a new mine section. It was apparent, in driving 200 feet of slope, that the machine removed blasted material with greatly reduced time and labor requirements compared with conventional hand-loading methods.

Mine-Water Control.—Under the joint Federal-State program of mine-water control initiated in 1955, 16 projects had been approved by the close of 1957. The aggregate cost, contracted or estimated, of the approved projects was slightly less than $5 million shared equally by the Federal and State Governments.

Nine of the projects require large-capacity, deep-well pumps to control the level of water pools in underground workings. A total of 21 pumps, with an aggregate capacity of 102,000 gallons of water per minute, will be used in these projects. The other seven projects propose surface-drainage improvements, such as concrete flumes and pipes, steel and wood flumes, and the backfilling of abandoned strip pits to prevent or reduce surface-water seepage into underground mine-workings.

The first project under the program was completed in 1957. It comprised installation of concrete flumes and culverts in the stream bed of Boston Creek, Luzerne County. This completed project will reduce the infiltration of surface water into underlying active mine workings an estimated 200 million gallons per year.

Preparation.—Preliminary experiments on preparing minimum-ash fractions from conventional domestic coal sizes with a new 10-compartment washability-assay tank indicate that, for a low-volatile, hard-structure anthracite, increments containing as little as 1.25 percent ash can be obtained. On a high-volatile anthracite, increments with as little as 0.75 percent ash have been prepared.

A progress report[2] of the American Mining Congress summarizes data on 21 heat-drying installations working on fine coal. Size of feed varied in the different installations up to a maximum of 1¼ inches. Total surface moisture in the feed ranged from 3.8 to 14.5 percent and was reduced by the equipment to a range of 1 to 4 percent in the discharge. Primary dust collectors in the drying systems usually were cyclones.

Installation of twin-deck washing tables in 1957 has been described[3] as an outstanding development in coal preparation. These units double the feed capacity per square foot of floor space. They are suspended by wire cables for full-floating operation and thus eliminate impact on the supporting structure. With these units, requirements of launders, piping, wiring and connected horsepower are said to be halved. Cleaning efficiency is claimed to be the same as for a single-deck table.

During 1957, new preparation equipment[4] having a total capacity of 1,953 tons per hour was contracted for or installed at 19 anthracite plants. Much of the equipment was for cleaning and sizing fine coal.

Utilization.—A commercial-scale test by the Bureau in a Lurgi pressure gasifier in Germany demonstrated that moderate- and high-ash anthracite can be gasified successfully in a fixed bed with oxygen and steam at elevated pressures. Overall requirements of carbon, oxygen, and steam for synthesis gas produced from anthracite compared favorably with those reported for other solid fuels in any process. It was determined that some changes in the equipment and in the process would be necessary to take full advantage of the unique properties of anthracite. Further research will be required to develop an economic high—B. t. u. gas process using anthracite as a fuel.

In Bureau investigations,[5] anthracite for use in modern metallurgical equipment was heat-treated by both batch and continuous calcination to obtain a thermally stabilized product with not more than one percent volatile matter. Batch calcination was done in a sheet-steel retort in a movable-wall carbonizing oven. Continuous calcination was done in a pilot-scale vertical calciner. Tests of the continuously calcined anthracite in a commercial cupola gave satisfactory melting rates and metal temperatures. The iron produced with calcined anthracite was comparable with that from all-coke runs in the same cupola, except that the carbon content was slightly lower.

Although calcination minimizes thermal decrepitation, the strength of anthracite, as measured by the ASTM tumbler and drop-shatter test, is not increased by heat treatment. As a means of overcoming strength deficiencies, experiments were conducted on batches of calcined briquets made in the Bureau's laboratory. The tests demonstrated that after calcination the briquets, composed of more than 80 percent anthracite, were superior to metallurgical coke in the stability factor. The briquets were formed in a laboratory press at a pressure of 3,000 pounds per square inch and calcined at 1,715° F.

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[2] Bishop, Jack M., Operation and Maintenance of Thermal Dryers: Min. Cong. Jour., vol. 43, No. 9, September 1957, pp. 78–81.

[3] Joslin, R. C., Coal Preparation: Min. Cong. Jour., vol. 44, No. 2, February 1958, pp. 90–92.

[4] Coal Age, 1957 Developments in Mining and Preparation: Vol. 63, No. 2, February 1958, p. 101.

[5] Eckerd, J. W., and Tenny, R. F., Thermal Stabilization of Anthracite by Calcination: ASME Paper 57–FU–3, 1957, 14 p.

Test runs of small, industrial stokers designed to burn 100 to 400 pounds of anthracite per hour were made to determine thermal efficiencies of four different units in the boiler room of the Bureau of Mines Anthracite Experiment Station at Schuylkill Haven, Pa. A traveling-grate stoker attained maximum heat efficiency of 63 percent, whereas an underfed, side-dump, moving-bar-grate stoker showed maximum efficiencies of 73 to 78 percent in a series of runs. Tests of two essentially similar units—water-cooled, reciprocating-grate, crossfeed stokers—gave maximum efficiencies of 69 to 84 percent at different rates of coal feed.

Coke and Coal Chemicals

By J. A. DeCarlo, T. W. Hunter, and Maxine M. Otero

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GENERAL SUMMARY

THE COKE INDUSTRY produced the third highest quantity of coke, including breeze, on record and attained new peaks in output of gas, tar, crude light oil, and ammonia. The combined production of oven and beehive coke amounted to 75,950,721 net tons, a total exceeded only in 1951 and 1953 but 2 percent over 1956. Although the production of coke from slot-type and beehive ovens did not establish a new record in 1957, the output from slot-type ovens reached an alltime high, surpassing the preceding maximum of 1955 by 276,478 tons. This increase would have been much greater if the production rate in the first 6 months of 1957 had been maintained throughout the year. A slackening in pig-iron production in the latter part of 1957 affected coke ovens adversely, and slot-type-oven output dropped from 95.3 percent of capacity in January to 74 percent in December. Beehive-coke plants were affected to a greater extent, and production in December was only about one-third the quantity produced in January.

There were no major work stoppages in 1957 and only small changes in the labor force in the coke industry. According to the Bureau of Mines survey of injuries and employment, an average of 19,203 men worked daily in the oven-coke industry. The number of man-hours

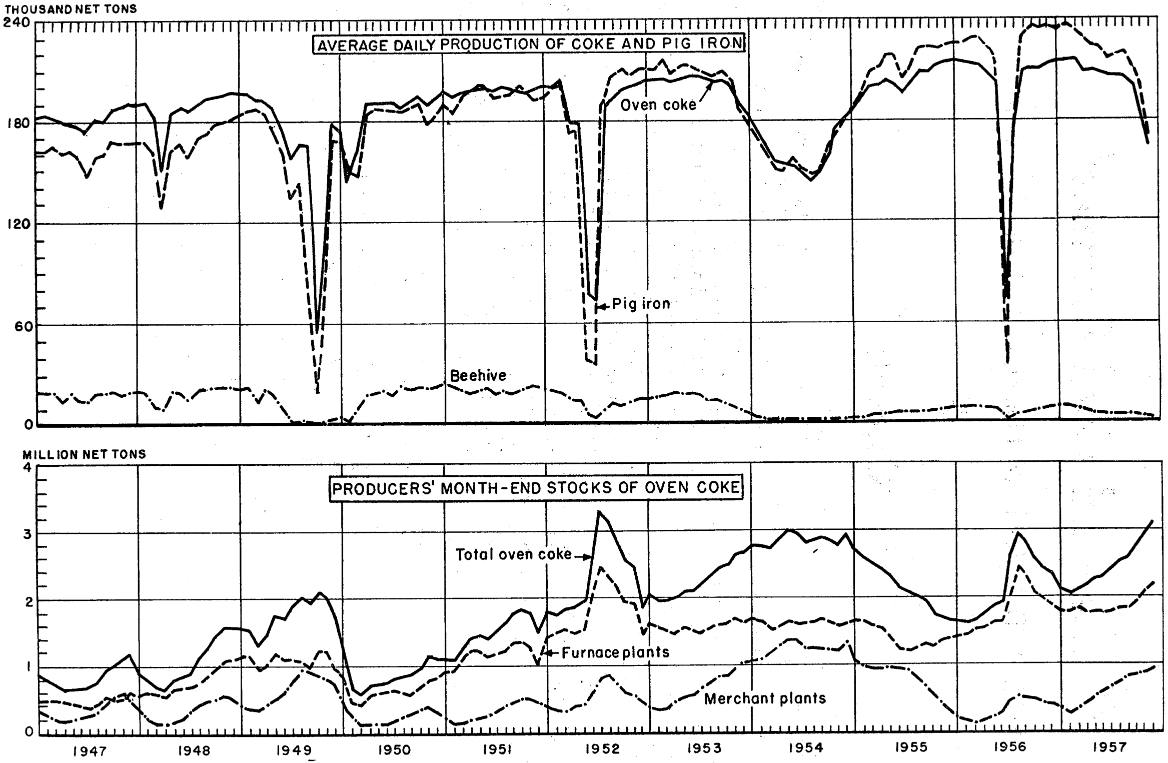

FIGURE 1.—Average daily production of oven and beehive coke and pig iron and producers' stocks of oven coke, 1947–57, by months.

worked totaled 55.9 million, an increase of 1 million over 1956, when the industry suffered a 35-day work stoppage. In the beehive industry an average of 1,021 men worked daily, and the man-hours totaled 1.4 million, a reduction of 134 men and 300,000 man-hours, respectively, from 1956. In recent years greater attention to modernizing and installing automatic equipment in oven-coke plants has resulted in increased productivity. In 1918, for example, 2.21 man-hours was required to produce 1 ton of oven coke; by 1950 only 0.91 man-hour per ton was required, and in 1957 0.76 man-hour.

Construction and modernization of coke ovens, coal- and coke-handling facilities, and coal-chemical-recovery equipment continued on a large scale in 1957. Coke producers reported that 560 new ovens with an annual coke capacity of 2,910,200 tons were completed and began operating in 1957 and that 611 ovens with an annual coke capacity of 3,332,700 tons were under construction on December 31. The following developments were probably the most outstanding in the coke industry during the year: Two new hydrogenation-extraction systems for refining crude light oil were installed, and a second synthetic-ammonia plant based on coke-oven gas was placed in operation.

The average value per ton of coal delivered to oven-coke plants reached an alltime high of $9.91, and the $6.25 per ton for coal delivered to beehive ovens was the highest since 1954. Higher mining costs and increased freight rates were the major factors in advancing coal costs. Coal miners were given an increase of $0.80 per day in April under the terms of their contract with the coal-producing companies. Freight rates on coal were increased $0.15 per ton on August 26; some exceptions were made for certain movements. Coal, including anthracite, charged into coke ovens totaled 108,409,103 tons valued at $1,061,454,996, increases of 2 and 8 percent, respectively, over 1956.

Demand for coke, particularly the metallurgical grades, was good during the first half of the year. The slackening in activity in the heavy industries during the latter part of the year reduced requirements for metallurgical coke, and stocks of oven coke at producers' plants increased more than 800,000 tons, reaching over 3.1 million tons. This was the highest year-end inventory of oven coke since 1938.

In spite of the slowdown in blast-furnace operations in the latter part of the year, 68,769,998 tons of coke was shipped to blast-furnace plants, an increase of 4 percent over 1956 but 1 percent below the 1953 record. Although the total movement of coke to blast furnaces failed to reach a new peak, the net coke consumed per ton of metal (pig iron and ferroalloys) continued to drop and was the lowest on record. According to data compiled by the American Iron and Steel Institute, only 1,703.6 pounds of coke was consumed for each ton of metal produced. This was 15.5 pounds less than the quantity used in 1956 and 233.6 pounds lower than in 1948. The improvement in fuel efficiency of blast furnaces in the past decade has been one of the notable achievements of the United States iron and steel industry; better blending techniques and preparation methods of coking coal were contributing factors.

Shipments to blast-furnace plants increased 4 percent over 1956, but shipments to each of the other major coke-consuming groups were smaller (foundries, producer- and water-gas plants, other industrials, and residential heating). The quantity shipped to iron and steel foundries dropped 12 percent; to producer-gas plants, 35 percent; to water-gas plants, 34 percent; for other industrial purposes, 6 percent; and for residential heating, 27 percent. Coke exported by producers in 1957 exceeded 1956 by 25 percent. According to reports from coke-producing companies, to the Bureau of Mines, 91 percent of all coke sold and/or used by producers was used in blast furnaces, 3 percent in iron and steel foundries, 1 percent in producer- and water-gas plants, 3 percent in miscellaneous industrial plants, and 1 percent for residential heating; 1 percent was exported.

A slight increase in the average yield of the basic coal-chemical materials (ammonia, crude tar, crude light oil, and coke-oven gas) and the record tonnage of coal carbonized in slot-type ovens resulted in peak production of these chemicals. Ammonia (NH_3 equivalent of all forms) output rose 4 percent, crude tar 5 percent, and crude light oil and coke-oven gas 3 percent each. Production of the derivatives from processing crude light oil (benzene, toluene, xylene, and solvent naphtha) by coke-plant operators increased 3, 2, 4, and 8 percent, respectively. Production of tar derivatives at coke plants dropped, however, because 2 companies sold their tar-processing facilities in 1957 to a tar distillery operating independently of the coke ovens, and statistics from these 2 plants were no longer reported to the Bureau of Mines (see Scope of Report).

The prices of coke increased during the year because of higher manufacturing costs. The prices of most coal chemicals, except ammonium sulfate, remained about the same. The largest increase was in the price of oven-foundry coke, which rose $2.27 per ton (9 percent). The price of crude tar increased 8 percent and averaged $0.13 per gallon. Prices of light-oil derivatives remained about the same during the year, but ammonium sulfate prices dropped for the fourth consecutive year. Four coke plants discontinued production of am-

TABLE 1.—Salient statistics of the coke industry in the United States, 1947–49 (average) and 1956–57

	1947–49 (average)	1956	1957
Coke produced:			
Oven net tons	65,088,462	71,992,242	73,860,692
Beehive do	5,559,940	[1] 2,490,284	2,090,029
Total do	70,648,402	[1] 74,482,526	75,950,721
Distribution, all coke sold or used:			
To blast-furnace plants do	56,145,621	[1] 66,344,870	68,769,998
To foundries do	3,393,176	[1] 2,952,544	2,588,860
To other industrial plants (including producer and water gas) net tons	7,391,615	[1] 3,631,221	3,116,438
For residential heating do	3,392,826	[1] 914,568	662,625
Imports, all coke do	181,000	130,955	117,951
Exports, all coke do	696,502	655,717	822,244
Apparent consumption, all coke do	69,852,671	[1] 73,324,094	74,432,093
Producers' stocks of coke, Dec. 31 do	[2] 1,769,456	2,334,441	3,148,776
Value of coal-chemical materials sold or used	$254,681,622	$383,354,279	$404,674,433
Value of coke and breeze produced	867,047,809	[1] 1,335,922,837	1,413,098,802
Total value of all products	1,121,729,431	[1] 1,719,277,116	1,817,773,235

[1] Revised figure.
[2] 1949.

monium sulfate in 1957 because the price was so low. The high cost of sulfuric acid and the low market price made it impracticable for these plants to continue recovering this material from their coke-oven gas.

The total value of coal carbonized was more than $1 billion. The value of all coal-chemical materials used and sold and coke and breeze produced amounted to $1,818 million, or 71 percent more than the cost of the coal. Coke and breeze supplied 78 percent of the dollar value of all products, while coal-chemical materials supplied the remainder (22 percent).

TABLE 2.—Statistical summary of the coke industry in the United States in 1957

	Slot-type ovens	Beehive ovens	Total
Coke produced—			
At merchant plants:			
Net tons	8,685,795	(2)	(2)
Value	$171,754.998		
At furnace plants: [1]			
Net tons	65,174,897		
Value	$1,180,341,162		
Total:			
Net tons	73,860,692	2,090,029	75,950,721
Value	$1,352,096,160	$31,191,475	$1,383,287,635
Breeze produced:			
Net tons	4,862,594	50,529	4,913,123
Value	$29,633,090	$178,077	$29,811,167
Coal carbonized:			
Bituminous:			
Net tons	104,546,631	3,473,138	108,019,769
Value	$1,035,869,162	$21,690,083	$1,057,559,245
Average per ton	$9.91	$6.25	$9.79
Anthracite:			
Net tons	389,334	---	389,334
Value	$3,895,751	---	$3,895,751
Average per ton	$10.01	---	$10.01
Total:			
Net tons	104,935,965	3,473,138	108,409,103
Value	$1,039,764,913	$21,690,083	$1,061,454,996
Average per ton	$9.91	$6.25	$9.79
Average yield in percent of total coal carbonized:			
Coke	70.39	60.18	70.06
Breeze (at plants actually recovering)	4.65	3.27	4.63
Ovens:			
In existence Jan. 1	15,923	[3] 9,659	[3] 25,582
In existence Dec. 31	15,948	9,519	25,467
Dismantled during year	535	[4] 605	1,140
In course of construction Dec. 31	611	18	629
Annual coke capacity Dec. 31 net tons	80,299,400	5,503,200	85,802,600
Coke used by producing companies—			
In blast-furnace plants:			
Net tons	63,044,738	(5)	63,044,738
Value	$1,144,340,159	(5)	$1,144,340,159
In foundries:			
Net tons	225,377	---	225,377
Value	$6,094,716	---	$6,094,716
For producer-gas manufacture:			
Net tons	112,928	---	112,928
Value	$1,753,798	---	$1,753,798
For water-gas manufacture:			
Net tons	516,189	---	516,189
Value	$6,377,646	---	$6,377,646
For other industrial purposes:			
Net tons	491,502	---	491,502
Value	$8,759,299	---	$8,759,299
Coke sold (commercial sales)—			
To blast-furnace plants:			
Net tons	4,041,678	[6] 1,683,582	[6] 5,725,260
Value	$64,989,166	$24,758,775	$89,747,941
To foundries:			
Net tons	2,333,049	30,434	2,363,483
Value	$67,113,469	$518,325	$67,631,794
To water-gas plants:			
Net tons	99,409	2,455	101,864
Value	$1,842,283	$36,821	$1,879,104

See footnotes at end of table.

TABLE 2.—Statistical summary of the coke industry in the United States in 1957—Continued

	Slot-type ovens	Beehive ovens	Total
Coke sold—Continued			
To other industrial plants:			
Net tons	1,522,884	371,071	1,893,955
Value	$23,685,959	$5,845,048	$29,531,007
For residential heating:			
Net tons	660,426	2,199	662,625
Value	$11,304,260	$23,483	$11,327,743
Disposal of breeze:			
Used by producing companies—			
For steam raising:			
Net tons	2,113,472	----------------	2,113,472
Value	$11,723,830	----------------	$11,723,830
For sintering iron ore:			
Net tons	637,956	----------------	637,956
Value	$3,555,347	----------------	$3,555,347
For other industrial purposes:			
Net tons	528,514	----------------	528,514
Value	$3,215,464	----------------	$3,215,464
Sold (commercial sales):			
Net tons	1,176,734	50,463	1,227,197
Value	$8,290,993	$177,901	$8,468,894
Average receipts per ton (commercial sales):			
Blast-furnace coke	$16.08	$14.63	$15.68
Foundry coke	$28.77	$17.03	$28.62
Water-gas coke	$18.53	$15.00	$18.45
Other industrial coke	$15.55	$15.75	$15.59
Residential heating coke	$17.12	$10.68	$17.10
Breeze	$7.05	$3.53	$6.90
Producers' stocks, Dec. 31:			
Blast-furnace coke net tons	2,569,128	10,591	2,579,719
Foundry coke do	107,378	----------------	107,378
Residential heating and other coke do	460,316	1,363	461,679
Breeze do	1,346,742	210	1,346,952
Coal-chemical materials produced:			
Tar, crude gallons	873,474,352	----------------	873,474,352
Ammonium sulfate or equivalent [7] pounds	2,027,449,979	----------------	2,027,449,979
Gas M cubic feet	1,090,845,870	----------------	1,090,845,870
Burned in coking process percent	34.51	----------------	34.51
Surplus sold or used do	63.01	----------------	63.01
Wasted do	2.48	----------------	2.48
Crude light oil gallons	301,088,346	----------------	301,088,346
Yield of coal-chemical materials per ton of coal:			
Tar, crude gallons	8.32	----------------	8.32
Ammonium sulfate or equivalent [7] pounds	19.56	----------------	19.56
Gas M cubic feet	10.40	----------------	10.40
Crude light oil gallons	2.94	----------------	2.94
Value of coal-chemical materials sold or used:			
Tar, crude:			
Used by producers as fuel [8]	$46,902,161	----------------	$46,902,161
Sold	$57,508,917	----------------	$57,508,917
Ammonia (sulfate and liquor) [7]	$30,267,479	----------------	$30,267,479
Gas (surplus)	$164,757,626	----------------	$164,757,626
Crude light oil and derivatives	$78,559,617	----------------	$78,559,617
Other coal-chemical materials[9]	$26,678,633	----------------	$26,678,633

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[1] Plants associated with iron blast furnaces (refer to definition in Scope of Report).
[2] Not separately recorded.
[3] Revised figure.
[4] Idle and not expected to resume production; removed from list of available ovens.
[5] Included with sales of blast-furnace coke to avoid disclosing individual company figures.
[6] Includes small quantity used by producers.
[7] Includes diammonium phosphate and ammonium thiocyanate.
[8] Includes pitch-of-tar.
[9] Naphthalene, tar derivatives and miscellaneous materials.

TABLE 3.—Summary of oven-coke operations in the United States in 1957, by States

State	In existence Dec. 31 [1]		Coal carbonized (net tons)	Yield of coke from coal (percent)	Coke produced (net tons)	Value of coke at ovens	
	Plants	Ovens				Total	Per ton
Alabama	7	1,361	8,122,192	72.88	5,919,434	$110,808,402	$18.72
California, Colorado, and Utah	4	751	5,147,772	62.45	3,214,807	75,929,139	23.62
Illinois	7	647	4,085,945	71.42	2,918,015	55,453,391	19.00
Indiana	5	2,091	13,402,537	72.78	9,754,559	214,229,291	21.96
Kentucky, Tennessee, and Texas	4	380	2,895,310	70.47	2,040,468	32,319,015	15.84
Maryland	1	752	4,759,214	72.09	3,430,863	(2)	(2)
Massachusetts	1	108	815,806	67.96	554,398	(2)	(2)
Michigan	4	769	4,936,286	75.11	3,707,430	67,391,899	18.18
Minnesota	3	241	1,279,537	71.64	916,713	18,977,175	20.70
New Jersey	2	341	1,326,065	72.96	967,526	(2)	(2)
New York	3	831	5,740,590	69.60	3,995,320	65,270,289	16.34
Ohio	15	2,439	16,037,991	70.45	11,299,353	198,611,442	17.58
Pennsylvania	14	4,069	29,213,075	68.75	20,082,883	343,692,212	17.11
West Virginia	5	813	5,679,115	69.34	3,938,002	62,071,263	15.76
Connecticut, Missouri, and Wisconsin	3	355	1,494,530	75.00	1,120,921	25,205,930	22.49
Undistributed						82,136,712	16.58
Total 1957	78	15,948	104,935,965	70.39	73,860,692	1,352,096,160	18.31
At merchant plants	22	2,420	12,099,302	71.79	8,685,795	171,754,998	19.77
At furnace plants	56	13,528	92,836,663	70.20	65,174,897	1,180,341,162	18.11
Total 1956	79	15,923	102,248,733	70.41	71,992,242	1,274,213,780	17.70

[1] Excludes plants retired permanently during year.

[2] Included with "Undistributed" to avoid disclosing individual company figures.

TABLE 4.—Summary of beehive-coke operations in the United States in 1957, by States

State	In existence Dec. 31 [1]		Coal carbonized (net tons)	Yield of coke from coal (percent)	Coke produced (net tons)	Value of coke at ovens	
	Plants	Ovens				Total	Per ton
Pennsylvania	48	8,036	2,592,783	62.38	1,617,466	$23,324,155	$14.42
Virginia	4	483	378,896	53.57	202,958	3,051,195	15.03
Kentucky, Utah, and West Virginia	6	1,000	501,459	53.76	269,605	4,816,125	17.86
Total 1957	58	9,519	3,473,138	60.18	2,090,029	31,191,475	14.92
Total 1956 [2]	62	9,659	4,089,215	60.90	2,490,284	35,251,941	14.16

[1] Excludes plants retired permanently during year.

[2] Revised figures.

SCOPE OF REPORT

This chapter on coke and related products is the 75th prepared by the Bureau of Mines and its predecessor, the Federal Geological Survey. Although the Survey began the annual canvass of the coke industry in 1882, statistics on coke go back to 1880, and this report continues the series through 1957. Except where otherwise noted, data in this chapter were voluntarily supplied to the Bureau of Mines by coke-producing companies operating within continental United States. These data are confined to products made in high-temperature slot-type and beehive-coke ovens and do not include products made by other carbonization processes (coal-gas retorts, low-temperature carbonization of coal, and carbonization of residues from refining crude tar and petroleum). Separate statistics on the production of coke in coal-gas retorts and low- and medium-temperature carbonization equipment are not shown in this chapter; less than three companies employed these processes in the United States in 1957. Production of petroleum coke (including catalyst coke) totaled 6.7 million tons in 1957, and the United States Tariff Commission reported that 28,000 tons of coal-tar-pitch coke was produced.

Several minor changes from preceding chapters have been incorporated in 1957. In accordance with established policy in the Bureau of Mines, data on production of coke and coal chemicals in States where there are less than three producers are published only with the express permission of the producers involved. For this reason, it was necessary to group some States with single plants.

In 1957 the Inland Steel Co., Indiana Harbor, Ind., and the Interlake Iron Corp., Chicago, Ill., sold their tar-processing facilities at these locations to the Koppers Co., Inc., Pittsburgh, Pa. The new owner operated these facilities independently of coke operations, and statistics on tar products were reported to the United States Tariff Commission instead of to the Bureau of Mines. This change reduced the number of coke-producing companies operating tar-processing facilities and made it necessary for the Bureau of Mines to discontinue publishing statistics on creosote oil, naphthalene, and phenol to avoid disclosing individual company data. The Bureau transmits these data, as well as those on all other organic chemicals produced by the coke industry, to the Tariff Commission for inclusion in its monthly and annual reports on synthetic organic chemicals.

The coke industry in 1957 consisted of 45 companies that owned and operated 79 oven-coke plants and 50 companies that owned 62 beehive-coke plants. Reports were received from each oven-coke plant and from all but three beehive-coke producers. As submission of these reports is not mandatory, the Bureau of Mines was unable to obtain reports from these three plants; the output was estimated from railroad reports of their carloadings. Coverage of the beehive industry is believed to be complete.

The terms "merchant" and "furnace" plants in this chapter apply only to oven-coke plants. Furnace plants are those that are owned or are financially affiliated with iron and steel companies whose main business is producing coke for use in their own blast furnaces. All other oven-coke plants are classified as merchant. They include those that manufacture metallurgical, industrial, and residential heating grades of coke for sale on the open market; coke companies associated with chemical plants or gas utilities; and those affiliated with local iron works, where only a small part (less than 50 percent of their output) is used in affiliated blast furnaces.

The Bureau of Mines does not collect data on the manufacturing costs of coke and coal chemicals. The values and prices of coal, coke, and other products shown in this chapter were obtained from annual reports submitted to the Bureau of Mines by producing companies.

For commercial sales of coke, gas, and coal chemicals, the dollar values are the prices f. o. b. ovens. For coke, breeze, crude tar, pitch, and surplus gas used as fuel, the market values were assigned by the producing companies.

"Coke", as used in this chapter, refers only to large sizes (usually one-half inch plus) from which smaller sizes (known as breeze) have been screened. Metallurgical coke refers to grades used for smelting and casting ferrous metals in blast furnaces and foundries. The standard unit of measurement in the coke industry is the net or short ton of 2,000 pounds, which is used throughout this chapter.

OVEN AND BEEHIVE COKE AND BREEZE

MONTHLY PRODUCTION

TABLE 5.—Coke produced in the United States and average per day, 1947–49 (average) and 1955–57, by months, in net tons [1]

Month	1947–49 (average)		1955		1956 [2]		1957	
	Total	Daily average	Total	Daily average	Total	Daily average	Total	Daily average
Oven coke:								
January	5,875,300	189,500	5,757,300	185,700	6,665,300	215,000	6,613,200	213,300
February	5,393,400	192,600	5,338,200	190,700	6,238,700	215,100	5,973,300	213,300
March	5,775,800	186,300	6,143,300	198,200	6,629,600	213,900	6,639,700	214,200
April	5,231,600	174,400	6,025,900	200,900	6,384,200	212,800	6,229,200	207,600
May	5,707,400	184,100	6,299,500	203,200	6,471,300	208,700	6,459,600	208,400
June	5,409,700	180,300	6,008,500	200,300	6,023,900	200,800	6,215.100	207,200
July	5,355,900	172,800	6,048,600	195,100	2,258,500	72,900	6,376,400	205,700
August	5,564,400	179,500	6,240,600	201,300	5,504,700	177,600	6,382,600	205,900
September	5,394,700	179,800	6,245,100	208,200	6,303,000	210,100	6,167,600	205,600
October	4,519,000	145,800	6,462,200	208,500	6,561,100	211,600	6,166,000	198,900
November	5,003,500	166,800	6,364,100	212,100	6,332,300	211,100	5,540,500	184,700
December	5,857,800	189,000	6,650,900	214,500	6,619,600	213,500	5,097,500	164,400
Total	65,088,500	178,300	73,584,200	201,600	71,992,200	196,700	73,860,700	202,400
Beehive coke:								
January	623,500	20,100	61,800	2,000	266,700	8,600	266,700	8,600
February	574,900	20,600	65,000	2,300	254,000	8,800	254,800	9,100
March	461,900	14,900	106,200	3,400	279,300	9,000	270,400	8,700
April	445,000	14,800	122,700	4,100	256,900	8,600	221,400	7,400
May	582,300	18,800	138,200	4,500	266,000	8,600	182,000	5,800
June	432,500	14,400	153,500	5,100	220,000	7,300	157,200	5,200
July	304,500	9,800	143,600	4,600	53,500	1,700	143,600	4,600
August	425,000	13,700	164,300	5,300	116,800	3,700	157,000	5,100
September	413,500	13,800	162,000	5,400	153,400	5,100	142,700	4,700
October	428,800	13,800	178,300	5,700	186,900	6,100	123,400	4,000
November	411,700	13,700	190,600	6,400	208,800	6,900	90,000	3,000
December	456,300	14,700	231,400	7,500	228,000	7,400	80,800	2,600
Total	5,559,900	15,300	1,717,600	4,700	2,490,300	6,800	2,090,000	5,700
Total:								
January	6,498,800	209,600	5,819,100	187,700	6,932,000	223,600	6,879,900	221,900
February	5,968,300	213,200	5,403,200	193,000	6,492,700	223,900	6,228,100	222,400
March	6,237,700	201,200	6,249,500	201,600	6,908,900	222,900	6,910,100	222,900
April	5,676,600	189,200	6,148,600	205,000	6,641,100	221,400	6,450,600	215,000
May	6,289,700	202,900	6,437,700	207,700	6,737,300	217,300	6,641,600	214,200
June	5,842,200	194,700	6,162,000	205,400	6,243,900	208,100	6,372,300	212,400
July	5,660,400	182,600	6,192,200	199,700	2,312,000	74,600	6,520,000	210,300
August	5,989,400	193,200	6,404,900	206,600	5,621,500	181,300	6,539,600	211,000
September	5,808,200	193,600	6,407,100	213,600	6,456,400	215,200	6,310,300	210,300
October	4,947,800	159,600	6,640,500	214,200	6,748,000	217,700	6,289,400	202,900
November	5,415,200	180,500	6,554,700	218,500	6,541,100	218,000	5,630,500	187,700
December	6,314,100	203,700	6,882,300	222,000	6,847,600	220,900	5,178,300	167,000
Grand total	70,648,400	193,600	75,301,800	206,300	74,482,500	203,500	75,950,700	208,100

[1] Daily average calculated by dividing monthly production by number of days in month.
[2] Beehive and total figures revised.

PRODUCTION BY FURNACE AND MERCHANT PLANTS

Furnace oven-coke plants produced more coke in 1957 than ever before; output from nonfurnace (merchant plants) decreased 9 percent from 1956 and was 34 percent lower than the 1947–49 average.

Furnace plants also supplied the highest proportion of total oven coke. During the depression years of the 1930's, merchant plants supplied nearly 50 percent of the United States output of oven coke. The annual output from merchant plants averaged 11.4 million tons for the period 1930 to 1940, ranging from a low of 9.8 million tons in 1932 to 13.1 million tons in 1937. Increased industrial activity during and following World War II kept coke requirements high, and annual production from merchant plants for 1940 to 1950 averaged 13.5 million tons. Production remained high in 1951 because of the Korean War but has since dropped rapidly, averaging 9.6 million tons annually for the years 1952 through 1957. The principal factor in the decline of coke production from merchant plants was closing of gas-utility coke plants whose production has dropped about 3 million tons since 1947. These plants closed because coke-oven gas and "domestic" coke could not compete economically with natural gas and fuel oil in many areas, and gas utilities retired their coke ovens permanently and shifted to distribution of natural gas.

Although requirements for coke and coke-oven gas for residential and commercial heating declined, those for metallurgical purposes increased substantially. To meet this rise, furnace plants increased their carbonizing capacities, and production rose steadily. In the 10 years 1948 to 1957 production from furnace plants rose about 2 percent per year. Obviously, at the end of 1957 this upward trend at furnace plants would continue because of the large amount of carbonizing capacity under construction.

TABLE 6.—Monthly and average daily production of oven coke in the United States, 1947–49 (average) and 1956–57, by types of plant, in net tons

Month	1947–49 (average)		1956		1957	
	Merchant plants	Furnace plants	Merchant plants	Furnace plants	Merchant plants	Furnace plants
Monthly production:						
January	1,174,700	4,700,600	871,400	5,793,900	794,800	5,818,400
February	1,070,100	4,323,300	815,300	5,423,400	725,400	5,247,900
March	1,157,800	4,618,000	857,500	5,772,100	806,400	5,833,300
April	1,043,000	4,188,600	815,700	5,568,500	725,400	5,503,800
May	1,129,300	4,578,100	860,100	5,611,200	754,100	5,705,500
June	1,080,700	4,329,000	773,100	5,250,800	717,400	5,497,700
July	1,082,100	4,273,800	679,500	1,579,000	735,500	5,640,900
August	1,097,700	4,466,700	745,500	4,759,200	735,000	5,647,600
September	1,072,800	4,321,900	763,100	5,539,900	696,900	5,470,700
October	1,047,400	3,471,600	807,000	5,754,100	708,800	5,457,200
November	1,026,000	3,977,500	780,200	5,552,100	631,800	4,908,700
December	1,132,800	4,725,000	806,800	5,812,800	654,300	4,443,200
Total	13,114,400	51,974,100	9,575,200	62,417,000	8,685,800	65,174,900
Average daily production:						
January	37,900	151,600	28,100	186,900	25,600	187,700
February	38,200	154,400	28,100	187,000	25,900	187,400
March	37,300	149,000	27,700	186,200	26,000	188,200
April	34,800	139,600	27,200	185,600	24,200	183,400
May	36,400	147,700	27,700	181,000	24,300	184,100
June	36,000	144,300	25,800	175,000	23,900	183,300
July	34,900	137,900	21,900	51,000	23,700	182,000
August	35,400	144,100	24,100	153,500	23,700	182,200
September	35,700	144,100	25,400	184,700	23,200	182,400
October	33,800	112,000	26,000	185,600	22,900	176,000
November	34,200	132,600	26,000	185,100	21,100	163,600
December	36,600	152,400	26,000	187,500	21,100	143,300
Average for year	35,900	142,400	26,200	170,500	23,800	178,600

TABLE 7.—Number and production of oven-coke plants in the United States, 1929, 1939, 1947–49 (average), and 1953–57, by types of plant

Year	Number of active plants [1]		Coke produced (net tons)		Percent of production	
	Merchant plants	Furnace plants	Merchant plants	Furnace plants	Merchant plants	Furnace plants
1929	41	46	12, 187, 439	41, 224, 387	22. 8	77. 2
1939	39	45	11, 070. 506	31, 811, 807	25. 8	74. 2
1947–49 (average)	[2] 31	[2] 55	13, 114, 373	51, 974, 089	20. 1	79. 9
1953	25	58	10, 965, 352	62, 628, 176	14. 9	85. 1
1954	24	58	7, 362, 967	51, 698, 475	12. 5	87. 5
1955	23	58	9, 094, 527	64, 489, 687	12. 4	87. 6
1956	23	57	9, 575, 194	62, 417, 048	13. 3	86. 7
1957	22	57	8, 685, 795	65, 174, 897	11. 8	88. 2

[1] Includes plants operating any part of year.
[2] On Dec. 31, 1949.

PRODUCTION BY STATES AND DISTRICTS

Coke output increased in 14 of the 22 producing States in 1957; the largest percentage increases were in Virginia, Texas, and Maryland, where output rose 22, 17, and 12 percent, respectively, over 1956. Indiana gained more than 834,000 tons, the largest increase in tonnage. Production decreased in eight States; the lowest percentage decreases were in New Jersey, Minnesota, and Massachusetts. In the past 10 years the largest gains were made in Maryland, Ohio, Indiana, Michigan, and West Virginia. The increases in output of coke in these States were due to greater blast-furnace capacity, which required more coke. Substitution of natural gas for coke-oven gas

TABLE 8.—Coke produced in the United States, 1947–49 (average) and 1954–57, by States, in net tons

State	1947–49 (average)	1954	1955	1956	1957
Oven coke:					
Alabama	5, 682, 198	5, 301, 550	6, 245, 253	5, 763, 749	5, 919, 434
California, Colorado, and Utah	2, 155, 788	2, 287, 608	2, 938, 005	3, 115, 791	3, 214, 807
Illinois	3, 558, 768	2, 248, 206	3, 040, 900	2, 802, 223	2, 918, 015
Indiana	8, 301, 067	8, 200, 262	9, 482, 233	8, 920, 369	9, 754, 559
Kentucky, Tennessee, and Texas	1, 374, 287	1, 484, 408	2, 013, 405	1, 926, 753	2, 040, 468
Maryland	2, 054, 315	3, 078, 371	3, 235, 527	3, 050, 420	3, 430, 863
Massachusetts	1, 048, 037	516, 344	550, 868	608, 052	554, 398
Michigan	2, 717, 650	2, 308, 924	3, 421, 141	3, 531, 031	3, 707, 430
Minnesota	841, 976	803, 860	1, 029, 228	1, 012, 564	916, 713
New Jersey	1, 396, 082	929, 768	992, 566	1, 223, 050	967, 526
New York	5, 507, 449	3, 578, 703	4, 035, 076	3, 825, 368	3, 995, 320
Ohio	9, 847, 621	8, 228, 873	11, 701, 266	11, 799, 045	11, 299, 353
Pennsylvania	15, 964, 464	15, 566, 002	19, 488, 993	19, 098, 406	20, 082, 883
West Virginia	3, 101, 109	3, 708, 905	4, 324, 863	4, 197, 403	3, 938, 002
Connecticut, Missouri, and Wisconsin	[1] 1, 537, 651	819, 658	1, 084, 890	1, 118, 018	1, 120, 921
Total	65, 088, 462	59, 061, 442	73, 584, 214	71, 992, 242	73, 860, 692
Beehive coke:					
Colorado	7, 163				
Pennsylvania	4, 848, 550	432, 061	1, 313, 694	[2] 2, 033, 852	1, 617, 466
Virginia	190, 200	72, 092	140, 555	165, 968	202, 958
Kentucky, Utah, and West Virginia	514, 027	96, 901	263, 363	290, 464	269, 605
Total	5, 559, 940	601, 054	1, 717, 612	[2] 2, 490, 284	2, 090, 029
Grand total	70, 648, 402	59, 662, 496	75, 301, 826	[2] 74, 482, 526	75, 950, 721

[1] Includes Rhode Island.
[2] Revised figure.

along the Atlantic seaboard caused a number of gas-utility plants to discontinue operations and several others to curtail their coke production. This resulted in a drop in production in New York, Massachusetts, and New Jersey; in addition, the only coke plant in Rhode Island discontinued production in 1953.

The Pittsburgh-Youngstown district, comprising an area smaller than Texas, continued as the leading coke-producing center of the United States. It produced one-third of the national oven-coke output and, since the end of World War II, has increased production 7.8 million tons or 47 percent. While this district has shown the largest gain in volume, the Western district has made the largest gain in percent (98).

TABLE 9.—Oven coke produced in the United States in 1957, by steel-producing districts [1]

District	In existence Dec. 31		Coal carbonized (net tons)	Market value at ovens		Yield of coke from coal (percent)	Coke produced	
	Plants	Ovens		Total	Per ton		Net tons	Percent of total
Eastern	16	3,526	22,927,976	$265,690,037	$11.59	71.59	16,413,943	22.2
Pittsburgh-Youngstown	21	4,900	35,731,820	292,003,352	8.17	68.05	24,313,852	32.9
Cleveland-Detroit	10	1,962	12,014,231	125,215,036	10.42	72.92	8,760,944	11.9
Chicago	17	3,264	19,665,159	218,019,057	11.09	72.59	14,274,775	19.3
Southern	10	1,545	9,449,007	76,747,608	8.12	72.84	6,882,371	9.3
Western	4	751	5,147,772	62,089,823	12.06	62.45	3,214,807	4.4
Total	78	15,948	104,935,965	1,039,764,913	9.91	70.39	73,860,692	100.0

[1] As defined by American Iron and Steel Institute.

COKE BREEZE

Breeze is that part of coke that remains after all large sizes (usually one-half inch and over) are removed by screening. At oven-coke plants it is usually the next size smaller than Pea coke, that is, coke passing through a ½- or ¾-inch screen; however, there are no standard screen sizes. At beehive plants breeze is the part that passes through the tines of the loading fork or the screens of the loading machines, and its dimensions vary. All oven-coke plants are equipped to screen their coke and recover breeze. Few beehive plants have screening facilities, and most breeze produced there is wasted. In 1957 only 12 of the 43 active beehive plants reported the recovery of breeze.

Breeze usually has a higher ash content than coke and therefore a lower calorific value; for this reason the average value per ton is lower. This limits its uses, and long rail hauls can be justified only where it is used for special purposes and no substitute fuel is available. The major use of breeze is for steam raising for electric-power generation at or near the producing plants. Two new uses for breeze, sintering iron ore and smelting phosphate rock, have employed increased quantities of breeze in the past several years and are expected to expand in future. According to reports from coke-producing companies, 637,956 net tons was used by coke producers in 1957 for sintering iron ore. As complete coverage of sintering plants was not possible in the coke surveys and, to determine precisely how much coke breeze was being used for this purpose, the Bureau of Mines for the first time made a special survey of iron-ore agglomerating operations in 1957. Reports received showed that 868,027 tons of breeze was used to produce iron-ore sinter.

The Bureau did not attempt to obtain information from the producing companies on the major uses of breeze sold; data on the quantities used for smelting phosphate rock were not obtained, but approximately 600,000 tons of breeze was estimated as used for this purpose in 1957.

The average value per ton for breeze sold on the commercial market was $6.90, a 12-percent gain over 1956 and 82 percent over 1947–49. Detailed statistics on breeze production and disposal are shown in table 10.

TABLE 10.—Coke breeze recovered at coke plants in the United States in 1957, by States

State	Yield per ton of coal[1] (percent)	Produced		Sold	
		Net tons	Value	Net tons	Value
Oven coke:					
Alabama	4.70	381,385	$3,408,134	162,109	$1,464,585
California, Colorado, and Utah	6.04	310,845	2,068,387	92,809	916,308
Illinois	4.56	186,338	939.897	79,720	468.081
Indiana	5.56	745,677	5,043,671	189,685	1,148,356
Kentucky, Tennessee, and Texas	4.27	123,763	1,092,317	50,573	522,216
Maryland	5.09	242,270	(2)	29	(2)
Massachusetts	5.89	48,061	(2)	----------	----------
Michigan	4.00	197,583	1,197,417	99,325	590,745
Minnesota	3.88	49,602	236,284	12,328	85,194
New Jersey	6.50	86,203	(2)	1,624	(2)
New York	4.61	264,833	1,528,542	137	(2)
Ohio	4.66	747,392	4,626,648	287,704	2,017,004
Pennsylvania	3.94	1.152,106	5.651,565	103,646	552,848
West Virginia	4.38	232,210	1,109,211	68,257	323,268
Connecticut, Missouri, and Wisconsin	6.31	94,326	589,372	28,788	184,470
Undistributed	----------	----------	2,141,645	----------	17,918
Total 1957	4.65	4,862,594	29,633,090	1,176,734	8,290,993
At merchant plants	5.24	614,146	4,933,071	187,233	1,822,965
At furnace plants	4.58	4,248,448	24,700,019	989,501	6,468,028
Total 1956	4.67	4,771,813	26.207,396	1,123,658	7,231,372
Beehive coke:					
Pennsylvania	2.13	17,713	52,624	17,713	52,624
Kentucky, Utah, Virginia, and West Virginia	4.59	32,816	125,453	32,750	125,277
Total 1957	3.27	50,529	178,077	50,463	177,901
Total 1956[3]	3.79	98,980	249,720	79,253	191,535

See footnotes at end of table.

TABLE 10.—Coke breeze recovered at coke plants in the United States in 1957, by States—Continued

State	Used by producers—				Wasted (net tons)	On hand Dec. 31 (net tons)
	For steam raising		For other purposes [4]			
	Net tons	Value	Net tons	Value		
Oven coke:						
Alabama	138,623	$1,176,593	78,501	$733,785	----------	36,441
California, Colorado, and Utah	----------	----------	227,904	1,232,962	----------	21,563
Illinois	86,228	343,949	21,623	103,456	----------	38,083
Indiana	79,556	457,981	129,710	879,343	----------	682,889
Kentucky, Tennessee, and Texas	30,996	347,939	37,907	167,830	----------	16,640
Maryland	185,763	(2)	24,776	(2)	----------	46,888
Massachusetts	48,061	(2)	----------	----------	----------	----------
Michigan	42,482	264,691	61,547	374,672	----------	7,260
Minnesota	23,448	72,215	14,707	83,928	----------	10,534
New Jersey	92,619	(2)	----------	----------	----------	14,709
New York	190,990	1,115,814	55,280	(2)	----------	109,380
Ohio	239,729	1,365,479	237,555	1,385,928	----------	103,647
Pennsylvania	828,178	4,004,302	155.778	790,159	----------	241,438
West Virginia	62,843	301,457	121.182	(2)	----------	9,790
Connecticut, Missouri, and Wisconsin	63,956	393,961	----------	----------	----------	7.480
Undistributed	----------	1,879,449	----------	1,018,748	----------	----------
Total 1957	2,113,472	11,723,830	1,166,470	6,770,811	----------	[5]1,346,742
At merchant plants	391,086	2,738,164	29,885	278,668	----------	80,474
At furnace plants	1,722,386	8,985,666	1,136,585	6,492,143	----------	1,266,268
Total 1956	2,423,147	12,541,581	1,017,065	5,468,078	4,500	[5] 940,902
Beehive coke:						
Pennsylvania	----------	----------	----------	----------	3,225	----------
Kentucky, Utah, Virginia, and West Virginia	----------	----------	----------	----------	----------	210
Total 1957	----------	----------	----------	----------	3,225	210
Total 1956 [3]	----------	----------	18,170	(6)	1,600	144

[1] Computed by dividing production of breeze by coal carbonized at plants actually recovering breeze.
[2] Included with "Undistributed" to avoid disclosing individual company figures.
[3] Revised figures.
[4] Includes 637,956 net tons valued at $3,555,347 used for sintering iron ore.
[5] Includes some breeze resulting from the screening of coke at blast furnaces.
[6] Not published to avoid disclosing individual company figures.

NUMBER AND TYPE OF OVENS

Slot-Type Coke Ovens.—The number of slot-type ovens in existence on December 31, 1957, totaled 15,948, an increase of 25 over 1956. The net gain in slot-type ovens was small because many were abandoned. All but a few of the abandoned ovens were to be dismantled for rebuilding. In the past 10 years most of the new ovens constructed were rebuilds or replacements for wornout ovens, as indicated by the gain of only 1,220 ovens out of 6,469 new ovens built since January 1, 1948. Most of the construction activity during this 10-year period occurred at furnace plants; at the end of 1957, 77 percent of the ovens were under 25 years old. Merchant plants have not paced furnace plants in building new ovens; only 36 percent of these ovens were under 25 years of age. Although this statement is not intended to imply that 25 years is the serviceable life of a coke oven, past experience shows that after that time the ovens, with few exceptions, become increasingly difficult to maintain economically. For example, the average age of ovens dismantled for rebuilding in 1957 was 27 years.

At the close of 1957, 611 new ovens were under construction at furnace plants; none were reported under construction at merchant plants. Of the 611 ovens under construction, 379 represented additional ovens, and 232 were rebuilds. Of the 15,948 ovens in existence at the end of the year, 23 percent were Koppers, 48 percent Koppers-Becker, 9 percent Semet-Solvay, 20 percent Wilputte, and 40 Simon-Carves.

Beehive Ovens.—The number of operable beehive ovens reported to the Bureau of Mines in recent years has fluctuated with the demand for blast-furnace coke and the availability of oven coke. The increase in slot-type ovens during the past several years increased the supply of oven coke and reduced the demand for beehive coke. In addition, the decline in blast-furnace activity in the latter months of 1957 reduced coke requirements, and many beehive ovens had to discontinue operations. The total number of beehive ovens in existence decreased by 140, but the number in operating condition at the end of the year dropped by 829. No new beehive ovens have been built since the Lucerne ovens, at Lucerne, Pa., were brought into operation in 1952. Some repairing is done continuously, however, and 465 ovens were repaired or reactivated in 1957.

TABLE 11.—Slot-type coke ovens completed and abandoned in the United States in 1957 and number in existence at end of year, by States

State	Plants in existence Dec. 31	Ovens						
		In existence Dec. 31		New		Abandoned during year[1]	Under construction Dec. 31	
		Number	Annual coke capacity (net tons)	Number	Annual coke capacity (net tons)		Number	Annual coke capacity (net tons)
Alabama	7	1,361	6,414,300	77	397,400	140	63	406,700
California	1	225	1,069,500	--------	--------	--------	90	433,600
Colorado	1	218	958,000	--------	--------	38	31	169,000
Connecticut	1	70	410,000	--------	--------	--------	--------	--------
Illinois	7	647	3,169,900	102	579,000	80	--------	--------
Indiana	5	2,091	10,059,500	--------	--------	74	87	437,500
Kentucky	1	196	1,185,200	--------	--------	--------	--------	--------
Maryland	1	752	4,174,000	65	410,000	--------	63	294,000
Massachusetts	1	108	665,000	--------	--------	--------	--------	--------
Michigan	4	769	4,391,700	78	500,000	--------	--------	--------
Minnesota	3	241	1,026,800	--------	--------	--------	--------	--------
Missouri	1	85	316,000	--------	--------	4	--------	--------
New Jersey	2	341	1,500,000	--------	--------	--------	--------	--------
New York	3	831	4,583,100	--------	--------	--------	--------	--------
Ohio	15	2,439	12,247,900	110	536,000	164	178	988,000
Pennsylvania	14	4,069	20,473,600	128	487,800	35	99	603,900
Tennessee	1	44	264,000	--------	--------	--------	--------	--------
Texas	2	140	832,000	--------	--------	--------	--------	--------
Utah	2	308	1,345,700	--------	--------	--------	--------	--------
West Virginia	5	813	4,643,100	--------	--------	--------	--------	--------
Wisconsin	1	200	570,100	--------	--------	--------	--------	--------
Total 1957	78	15,948	80,299,400	560	2,910,200	535	611	3,332,700
At merchant plants	22	2,420	11,061,400	--------	--------	4	--------	--------
At furnace plants	56	13,528	69,238,000	560	2,910,200	531	611	3,332,700
Total 1956	79	15,923	79,965,100	302	1,758,200	418	631	3,309,300

[1] Includes ovens dismantled for rebuilding.

TABLE 12.—Age of slot-type coke ovens in the United States on Dec. 31, 1957 [1]

Age	Merchant plants		Furnace plants		Total			
	Number of ovens	Annual coke capacity (net tons)	Number of ovens	Annual coke capacity (net tons)	Number of ovens	Percent of total	Annual coke capacity (net tons)	Percent of total
Under 5 years	24	148, 900	2, 226	11, 693, 500	2, 250	14. 1	11, 842, 400	14. 7
From 5 to 10 years	335	1, 749, 000	3, 271	17, 881, 800	3, 606	22. 6	19, 630, 800	24. 5
From 10 to 15 years	157	704, 400	2, 002	10, 892, 000	2, 159	13. 5	11, 596, 400	14. 4
From 15 to 20 years	250	1, 466, 500	2, 119	11, 399, 900	2, 369	14. 9	12, 866, 400	16. 0
From 20 to 25 years	97	418, 200	746	4, 110, 900	843	5. 3	4, 529, 100	5. 6
From 25 to 30 years	160	853, 000	282	1, 529, 800	442	2. 8	2, 382, 800	3. 0
From 30 to 35 years	358	1, 771, 100	358	1, 686, 200	716	4. 5	3, 457, 300	4. 3
From 35 to 40 years	235	773, 600	1, 366	5, 554, 200	1, 601	10. 0	6, 327, 800	7. 9
40 years and over	804	3, 176, 700	1, 158	4, 489, 700	1, 962	12. 3	7, 666, 400	9. 6
Total	2, 420	11, 061, 400	13, 528	69, 238, 000	15, 948	100. 0	80, 299, 400	100. 0

[1] Age dates from first entry into operation or from last date of rebuilding.

TABLE 13.—Beehive-coke ovens reconstructed and abandoned in the United States in 1957 and number in existence at end of year, by States

State	Plants in existence Dec. 31	Ovens								
		In existence Dec. 31		In operating condition Dec. 31		Not in operating condition Dec. 31		Rebuilt or repaired	Abandoned or dismantled during year	In course of reconstruction Dec. 31
		Number	Annual coke capacity (net tons)	Number	Annual coke capacity (net tons)	Number	Annual coke capacity (net tons)			
Kentucky	1	193	120, 000	193	120, 000					
Pennsylvania	48	8, 036	4, 729, 700	5, 572	3, 403, 900	2, 464	1, 325, 800	465	412	10
Utah	1	297	144, 500	290	141, 100	7	3, 400			
Virginia	4	483	245, 000	460	232, 900	23	12, 100			8
West Virginia	4	510	264, 000	222	114, 800	288	149, 200		193	
Total 1957	58	9, 519	5, 503, 200	6, 737	4, 012, 700	2, 782	1, 490, 500	465	[1] 605	18
Total 1956	[2] 62	[2] 9, 659	[2] 5, 811, 900	[2] 7, 566	[2] 4, 597, 800	2, 093	1, 214, 100	[2] 290	[1] 735	18

[1] Idle and not expected to resume production; removed from list of available ovens.
[2] Revised figure.

TABLE 14.—Average number of beehive-coke ovens active in the United States in 1957, by months

Month	Number	Month	Number	Month	Number
January	5, 293	May	4, 590	September	3, 901
February	5, 422	June	4, 213	October	3, 426
March	5, 517	July	3, 984	November	3, 129
April	4, 767	August	3, 877	December	2, 762

CAPACITY OF OVEN-COKE PLANTS

The potential maximum annual coke capacity of oven-coke plants exceeded 80 million tons for the first time in1957, reaching 80,299,400 on December 31. Since 1949 or the beginning of the Korean War, when the iron and steel industry began a large expansion program, carbonizing capacity at furnace plants has increased about 2 percent per year and at the end of 1957 was almost 10 million tons greater than on January 1, 1950. The overall gain in oven-coke capacity was not as large, however, because merchant-plant capacity decreased more than 22 percent in this period. This held the total gain to approximately 1 percent per year or a total increase of 6.6 million tons.

The decline in capacity at merchant plants was due to lack of markets for coke and gas for residential heating. In addition, the increased capacity of furnace plants substantially reduced the dependence of the steel industry on merchant-coke plants. For example, the rate of coke production of merchant plants for 1957 averaged 79 percent of capacity, whereas furnace plants operated at 94 percent. This situation contrasted with conditions before World War II, when merchant plants usually operated at higher and more uniform rates than furnace plants because of their diversified coke markets.

The oven-coke industry operated at 92 percent of capacity in 1957, an increase of 2.3 points. This slight increase was due to the high operating rates maintained through the first three quarters of the year, as production dropped sharply in the last quarter, falling to a low of 74 percent in December.

TABLE 15.—Potential maximum annual coke capacity of all oven-coke plants in existence in the United States, 1949 and 1953–57

Year	Merchant plants				Furnace plants				Total			
	In existence Dec. 31		Potential maximum annual coke capacity (net tons)	Change from 1949 (percent)	In existence Dec. 31		Potential maximum annual coke capacity (net tons)	Change from 1949 (percent)	In existence Dec. 31		Potential maximum annual coke capacity (net tons)	Change from 1949 (percent)
	Plants	Ovens			Plants	Ovens			Plants	Ovens		
1949	30	3,057	14,209,200	------	55	12,047	59,500,900	------	85	15,104	73,710,100	------
1953	24	2,693	12,090,900	−14.9	58	13,296	66,167,100	+11.2	82	15,989	78,258,000	+6.2
1954	23	2,458	10,686,300	−24.8	58	13,433	67,909,300	+14.1	81	15.891	78,595,600	+6.6
1955	23	2,482	11,220,200	−21.0	58	13,557	68,455,300	+15.0	81	16,039	79,675,500	+8.1
1956	22	2,424	11,009,600	−22.5	57	13,499	68,955,500	+15.9	79	15,923	79,965,100	+8.5
1957	22	2,420	11,061,400	−22.2	56	13,528	69,238,000	+16.4	78	15,948	80,299.400	+8.9

TABLE 16.—Relationship of production to potential maximum capacity[1] at oven-coke plants in the United States, 1953–57, by months, in percent

Month	1953	1954	1955	1956	1957	Month	1953	1954	1955	1956	1957
January	96.8	82.6	85.6	97.5	95.3	August	93.5	67.9	93.3	81.2	92.6
February	96.4	78.4	87.9	97.5	95.3	September	92.5	69.8	96.5	96.2	92.5
March	95.8	75.0	91.4	97.0	95.7	October	91.8	76.6	96.7	96.9	89.5
April	93.9	70.6	92.6	96.5	92.7	November	89.6	81.4	98.4	96.6	83.1
May	93.8	70.0	93.7	94.7	93.1	December	85.0	84.4	99.5	97.8	74.0
June	94.3	70.4	92.9	91.9	92.5						
July	93.9	69.6	90.5	33.3	92.5	Year	93.1	74.7	93.3	89.7	92.0

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[1] Capacity of all ovens in existence, whether active or idle, based upon maximum daily capacity multiplied by days in month.

QUANTITY AND VALUE OF COAL CARBONIZED

The quantity of coal carbonized by the coke industry in 1957 was 2 percent higher than in 1956 but 5 percent below the record set in 1951, when more than 113.7 million tons (including anthracite) was charged into coke ovens. There were no major stoppages in the coke industry, and monthly consumption of coal was uniform until the last 2 months. The decline in activity in the heavy industries in the latter months of the year affected coking operations, and coal consumption dropped sharply in November and December. The average daily consumption rate in slot-type ovens in December was 70,000 tons below the maximum average in March. The drop in consumption from beehive ovens was more pronounced, as the average consumption in December was only about one-third of the March average.

As in previous years, Pennsylvania led all States in consumption of coking coal, supplying 28 percent of the total charged into slot-type ovens and 75 percent in beehives. Ohio, Indiana, and Alabama combined carbonized 36 percent of the total.

The total value of coal carbonized in 1957 soared to a new peak and exceeded $1 billion for the first time. Higher mining and transportation costs increased the delivered costs of coal to coke plants, and the average value per ton was 6 percent ($0.57) higher than the 1956 figure and 30 percent ($2.25) above the 1947–49 average. The costs of coal delivered to oven-coke plants increased $0.56 per ton (6 percent); coal costs at beehive ovens increased $0.26. Coal costs at oven-coke plants are always higher than at beehive ovens because coal used in beehive ovens is not transported any great distance and has smaller transportation charges. For example, the lowest value for coal delivered to oven-coke plants was in West Virginia, where the plants are only a short distance from the mines; the highest value (among the States on which data can be shown) was in Minnesota.

TABLE 17.—Bituminous coal carbonized in coke ovens in the United States, 1947–49 (average) and 1956–57, by months, in net tons

Month	1947–49 (average)			1956			1957		
	Slot type	Beehive	Total	Slot type	Beehive[1]	Total[1]	Slot type	Beehive	Total
Jan	8, 320, 100	987, 400	9, 307, 500	9, 450, 500	429, 500	9, 880, 000	9, 365, 800	436, 600	9, 802, 400
Feb	7, 647, 600	906, 500	8, 554, 100	8, 821, 300	418, 600	9, 239, 900	8, 463, 800	419, 800	8, 883, 600
Mar	8, 195, 000	726, 000	8, 921, 000	9, 424, 600	461, 900	9, 886, 500	9, 391, 800	447, 600	9, 839, 400
Apr	7, 448, 200	700, 900	8, 149, 100	9, 066, 500	419, 700	9, 486, 200	8, 805, 400	364, 400	9, 169, 800
May	8, 096, 100	905, 800	9, 001, 900	9, 168, 000	437, 800	9, 605, 800	9, 118, 900	305, 300	9, 424, 200
June	7, 697, 200	673, 900	8, 371, 100	8, 485, 600	362, 900	8, 848, 500	8, 775, 300	261, 600	9, 036, 900
July	7, 631, 400	482, 200	8, 113, 600	3, 125, 500	103, 300	3, 228, 800	9, 026, 800	241, 900	9, 268, 700
Aug	7, 901, 400	665, 500	8, 566, 900	7, 784, 800	187, 700	7, 972, 500	9, 036, 600	263, 200	9, 299, 800
Sept	7, 617, 700	645, 000	8, 262, 700	8, 915, 200	249, 100	9, 164, 300	8, 745, 600	235, 400	8, 981, 000
Oct	6, 397, 800	669, 100	7, 066, 900	9, 266, 700	304, 400	9, 571, 100	8, 722, 500	205, 000	8, 927, 500
Nov	7, 118, 300	641, 900	7, 760, 200	8, 980, 000	343, 200	9, 323, 200	7, 864, 600	153, 100	8, 017, 700
Dec	8, 326, 100	712, 700	9, 038, 800	9, 382, 700	371, 100	9, 753, 800	7, 229, 500	139, 300	7, 368, 800
Total	92, 396, 900	8, 716, 900	101, 113, 800	101, 871, 400	4, 089, 200	105, 960, 600	104, 546, 600	3, 473, 200	108, 019, 800

[1] Revised figures.

TABLE 18.—Anthracite carbonized at oven-coke plants in the United States, 1947–49 (average) and 1954–57, by months, in net tons

Month	1947–49 (average)	1954	1955	1956	1957
January	17,600	24,900	20,000	33,400	31,800
February	16,600	21,600	21,300	32,300	30,700
March	19,300	20,900	28,900	36,500	33,100
April	21,500	19,400	31,700	33,100	37,600
May	18,800	18,800	33,700	33,600	38,500
June	19,800	16,700	31,200	29,700	32,100
July	18,200	15,600	27,600	24,900	30,000
August	18,900	17,300	29,100	31,700	30,000
September	20,100	16,600	36,700	30,400	31,400
October	22,000	19,100	38,700	30,700	33,600
November	20,900	18,700	32,900	30,400	31,700
December	16,700	19,800	34,400	30,600	28,800
Total	230,400	229,400	366,200	377,300	389,300

TABLE 19.—Quantity and value at ovens of coal carbonized in the United States in 1957, by States

State	Quantity carbonized	Value		Coal per ton of coke	
	Net tons	Total	Per ton	Net tons	Value
Oven coke:					
Alabama	8,122,192	$62,708,107	$7.72	1.37	$10.59
California, Colorado, and Utah	5,147,772	62,089,823	12.06	1.60	19.31
Illinois	4,085,945	44,497,692	10.89	1.40	15.25
Indiana	13,402,537	149,060,569	11.12	1.37	15.28
Kentucky, Tennessee, and Texas	2,895,310	30,912,404	10.68	1.42	15.15
Maryland	4,759,214	(1)	(1)	1.39	(1)
Massachusetts	815,806	(1)	(1)	1.47	(1)
Michigan	4,936,286	50,754,166	10.28	1.33	13.69
Minnesota	1,279,537	14,855,263	11.61	1.40	16.20
New Jersey	1,326,065	(1)	(1)	1.37	(1)
New York	5,740,590	65,566,974	11.42	1.44	16.41
Ohio	16,037,991	159,611,002	9.95	1.42	14.13
Pennsylvania	29,213,075	256,284,602	8.77	1.45	12.76
West Virginia	5,679,115	42,989,340	7.57	1.44	10.92
Connecticut, Missouri, and Wisconsin	1,494,530	16,435,533	11.00	1.33	14.66
Undistributed	-----------	83,999,438	12.17	-----------	16.96
Total 1957	104,935,965	1,039,764,913	9.91	1.42	14.08
At merchant plants	12,099,302	129,986,686	10.74	1.39	14.97
At furnace plants	92,836,663	909,778,227	9.80	1.42	13.96
Total 1956	102,248,733	955,878,806	9.35	1.42	13.28
Beehive coke:					
Pennsylvania	2,592,783	16,786,094	6.47	1.60	10.38
Virginia	378,896	1,951,871	5.15	1.87	9.62
Kentucky, Utah, and West Virginia	501,459	2,952,118	5.89	1.86	10.95
Total 1957	3,473,138	21,690,083	6.25	1.66	10.38
Total 1956	[2] 4,089,215	[2] 24,508,348	5.99	1.64	9.84

[1] Included with "Undistributed" to avoid disclosing individual company figures.

[2] Revised figure.

TABLE 20.—Average value per net ton of coal carbonized at oven-coke plants in the United States, 1947–49 (average) and 1954–57, by States

State	1947–49 (average)	1954	1955	1956	1957
Alabama	$6.27	$6.69	$7.48	$7.68	$7.72
Illinois	9.00	10.03	9.73	10.44	10.89
Indiana	8.99	10.50	10.44	10.58	11.12
Michigan	7.98	9.03	8.71	9.76	10.28
Minnesota	9.40	10.33	10.49	10.16	11.61
New York	9.00	10.49	9.84	10.60	11.42
Ohio	7.75	8.85	8.58	9.35	9.95
Pennsylvania	6.88	8.05	7.84	8.36	8.77
West Virginia	5.79	6.96	6.80	6.97	7.57
Other States [1]	[2] 8.58	10.59	10.44	10.95	11.77
United States average	7.79	9.00	8.84	9.35	9.91
Value of coal per ton of coke	11.09	12.89	12.60	13.28	14.08

[1] California, Colorado, Connecticut, Kentucky, Maryland, Massachusetts, New Jersey, Tennessee, Texas, Utah, and Wisconsin.

[2] Includes Rhode Island.

TABLE 21.—Value of coal and products per net ton of coal carbonized in the United States, 1947–49 (average) and 1953–57

Year	Oven coke					Beehive coke	
	Value of coal per ton	Value per ton of coal				Value of coal per ton	Value per ton of coal
		Coke produced	Breeze produced	Coal-chemical materials used or sold [1]	Total		
1047–49 (average)	$7.79	$8.49	$0.19	$2.85	$11.53	$4.90	$7.22
1953	9.24	10.30	.21	3.58	14.09	6.36	9.27
1954	9.00	11.12	23	3.83	15.18	6.44	8.69
1955	8.84	11.44	.24	3.70	15.38	5.59	7.75
1956	9.35	12.46	.26	3.75	16.47	5.99	8.62
1957	9.91	12.88	.28	3.86	17.02	6.25	8.98

[1] Includes value of surplus gas and of tar and pitch-of-tar burned.

PREPARATION AND SOURCE OF COAL

Washed and Unwashed Coal.—The quantity of cleaned (washed) coal charged into coke ovens was the highest ever reported to the Bureau of Mines. The use of cleaned coal by coke-oven operators goes back before the turn of the century, but it was the early 1950's before the proportion of cleaned coal reached half of the total quantity carbonized. Mining of the best quality coals during the first half of the 20th century and hand loading permitted the selection of high-grade coal and made cleaning unnecessary before it was used. Declining reserves of premium coking coals and rapidly increasing coal-mine mechanization in the past two decades have necessitated washing or cleaning a larger part of the coals available. Until World War II (1941) only about one-fourth of the coal carbonized was processed in cleaning plants. Shortages of building materials during the war curtailed the construction of coal-cleaning plants, and there was little increase in the proportion of cleaned coal carbonized. Construction of cleaning plants boomed after World War II, and in the 10-year period beginning in 1947 the use of cleaned coal increased 17 percent a year. Thus in 1957 the quantity of cleaned coal carbonized more than doubled the quantity used in 1947. Most cleaning plants are near the mines; only three coke-producing companies operated washeries adjacent to the ovens. According to statistics collected by the Bureau of Mines, mechanical cleaning of bituminous coal at mines in Pennsylvania and West Virginia (the 2 principal coking-coal-producing States) increased from 25 and 23 percent of production in 1947 to 61 and 58 percent, respectively, in 1956, the latest year for which figures are available. Substantial increases occurred in Kentucky and Virginia, where cleaning rose from 15 and 17 percent to 56 and 43 percent, respectively, in the same period. These increases in washery capacities at coal mines naturally increased the availability of cleaned coking coal in all consuming States. The rise in use of cleaned coal in Pennsylvania, Ohio, and Indiana (the leading coal-consuming States) between 1947 and 1957 was 210 percent. In Michigan over 91 percent of the coal carbonized was washed in 1957, compared with 3 percent in 1947.

Blending.—Blending or mixing various types of coal before carbonization is an integral part of coal preparation at oven-coke plants. Virtually all coke plants obtain coal from more than one mine and from different fields; and, as the quality of coal varies from field to field and even from mine to mine in the same field, mixing or blending is necessary. Blending has several objectives and involves many important factors that must be considered by oven-coke-plant producers if the primary purpose of economically producing a good coke is to be achieved. The principal objectives are (1) to improve the physical quality and uniformity of the coke, (2) to control the pressure developed in the coke oven by the carbonizing process, (3) to control the yield of the products, and (4) to broaden the use of inferior coals.

Mixing or blending two types of coal (high- and low-volatile) is most common; some plants use a third coal (medium-volatile) or other blending material. The addition of low-volatile coal improves the physical structure of the coke and increases the yield of coke. Because of its expanding characteristics, the proportion of low-volatile coal that can be added is limited and is carefully controlled by the coke-plant operator. Usually about 20 percent low-volatile coal is mixed with high-volatile, although some plants reported they used as much as 50 percent low-volatile. Small quantities of anthracite fines were added to bituminous coking coal, particularly at plants producing foundry coke.

The mixing or blending of coal of different volatile content was practiced at 74 plants in 1957. Of these, 50 used high- and low-volatile coals (including 9 employing anthracite); 20, high-, medium-, and low- (including 9 employing anthracite); none, high- and medium-; and 4, low- and medium-volatile (including 2 employing anthracite). Of the plants that did not blend coals, 1 used straight high- and 4 used straight medium-volatile coal.

Bituminous coal obtained by coke-plant operators is shown in table 24, by volatile content. Alabama coke plants received the most medium-volatile coal, largely because it is available locally. Oven-coke plants in Indiana obtained the largest quantity of low-volatile coal, and Pennsylvania plants led all States in high-volatile coal.

Sources.—The Appalachian region, extending from Alabama northeastward to Pennsylvania, supplied 96 percent of all coal carbonized in the United States in 1957. In addition, about 80 percent of the coal charged into Canada's coke ovens and approximately 25 percent of western Europe's requirements were mined in this region, which produced high-, medium-, and low-volatile coals. All States in this region except Tennessee supplied high-volatile; Alabama was the leading supplier of medium-volatile; and West Virginia led all States in low-volatile coal. The low-volatile coals are extremely important because of their strong caking or coking characteristics and are in great demand by metallurgical-coke producers.

Coking-coal deposits west of the Mississippi River are much smaller and more widely scattered than the reserves of the Appalachian region. Coking coal was obtained from the Trinidad field of southern Colorado and northern New Mexico, the Sunnyside beds in the Castle Gate field of Utah, in Haskell and other counties in eastern Oklahoma, and in Sebastian County in western Arkansas. The Oklahoma-Arkansas deposits represent the only commercially developed source of supply of low-volatile coal in the west. A small quantity of coal was imported from Canada and carbonized in Utah.

The origin and destination of coking-coal shipments to oven-coke plants in 1957 are summarized in table 26.

TABLE 22.—Washed and unwashed coal carbonized in the United States in 1957, by States in which used, in net tons

State	Bituminous		Anthracite	Total
	Washed	Unwashed		
Oven coke:				
Alabama	7,788,326	320,680	13,186	8,122,192
California, Colorado, and Utah	2,668,306	2,479,466		5,147,772
Illinois	2,316,960	1,763,435	5,550	4,085,945
Indiana	12,793,160	563,170	46,207	13,402,537
Kentucky, Tennessee, and Texas	2,078,956	807,330	9,024	2,895,310
Maryland		4,759,214		4,759,214
Massachusetts		796,292	19,514	815,806
Michigan	4,504,022	362,451	69,813	4,936,286
Minnesota	927,428	335,702	16,407	1,279,537
New Jersey	1,001,328	287,619	37,118	1,326,065
New York	4,669,339	1,068,504	2,747	5,740,590
Ohio	12,110,068	3,882,154	45,769	16,037,991
Pennsylvania	20,413,924	8,745,635	53,516	29,213,075
West Virginia	3,987,562	1,691,553		5,679,115
Connecticut, Missouri, and Wisconsin	1,104,825	319,222	70,483	1,494,530
Total 1957	76,364,204	28,182,427	389,334	104,935,965
At merchant plants	8,000,440	3,744,818	354,044	12,099,302
At furnace plants	68,363,764	24,437,609	35,290	92,836,663
Total 1956	72,090,891	29,780,531	377,311	102,248,733
Beehive coke:				
Pennsylvania	1,613,181	979,602		2,592,783
Virginia	213,040	165,856		378,896
Kentucky, Utah, and West Virginia	370,756	130,703		501,459
Total 1957	2,196,977	1,276,161		3,473,138
Total 1956	2,462,335	[1] 1,626,880		[1] 4,089,215

[1] Revised figure.

Some coke-producing companies, particularly those connected with iron and steel works, own or control coal mines. These "captive" mines supplied 62 percent of the total quantity received by slot-type ovens in 1957. Expansion of carbonizing capacity in the steel industry in recent years has increased requirements of coking coal. To meet these requirements, the coke-producing companies have developed new captive-mine capacity to maintain better control of quality and be assured of an adequate supply of coal during periods of heavy demand.

TABLE 23.—Quantity and percentage of bituminous coal carbonized in the United States that was washed, 1953–57

Year	Washed coal (net tons)			Unwashed coal (net tons)			Total coal carbonized (net tons)	Percentage of total washed
	At coke ovens	At beehive ovens	Total	At coke ovens	At beehive ovens	Total		
1953	63,206,898	3,244,008	66,450,906	41,441,432	4,982,089	46,423,521	112,874,427	58.9
1954	57,318,895	386,443	57,705,338	27,091,705	593,203	27,684,908	85,390,246	67.6
1955	73,735,758	1,670,764	75,406,522	30,771,947	1,198,448	31,970,395	107,376,917	70.2
1956	72,090,891	2,462,335	74,553,226	29,780,531	[1] 1,626,880	[1] 31,407,411	105,960,637	70.4
1957	76,364,204	2,196,977	78,561,181	28,182,427	1,276,161	29,458,588	108,019,769	72.7

[1] Revised figure.

TABLE 24.—Coal obtained by coke-oven operators in the United States in 1957, by consuming States and volatile content [1], in net tons

Coal consumed in—	High-volatile		Medium-volatile		Low-volatile		Total coa received (net tons)
	Net tons	Percent of total	Net tons	Percent of total	Net tons	Percent of total	
Alabama	489,777	5.8	7,616,684	90.8	283,466	3.4	8,389,927
California, Colorado, and Utah	4,341,299	79.4	416,923	7.6	709,715	13.0	5,467,937
Illinois	2,939,174	73.0	41,424	1.0	1,047,411	26.0	4,028,009
Indiana	7,545,974	54.5	555,334	4.0	5,745,261	41.5	13,846,569
Kentucky, Tennessee, and Texas	1,929,996	66.9	143,663	5.0	812,192	28.1	2,885,851
Maryland	3,519,650	68.2	----	----	1,641,319	31.8	5,160,969
Massachusetts	410,104	49.9	224,600	27.4	186,616	22.7	821,320
Michigan	3,324,597	66.6	276,660	5.5	1,392,877	27.9	4,994,134
Minnesota	660,732	52.1	195,520	15.4	411,671	32.5	1,267,923
New Jersey	573,899	44.9	384,055	30.1	319,309	25.0	1,277,263
New York	3,920,987	69.1	----	----	1,751,440	30.9	5,672,427
Ohio	11,713,480	72.7	308,187	1.9	4,090,221	25.4	16,111,888
Pennsylvania	23,967,035	78.9	1,817,924	6.0	4,604,882	15.1	30,389,841
West Virginia	4,827,495	84.7	----	----	872,146	15.3	5,699,641
Connecticut, Missouri, and Wisconsin	686,962	45.6	222,414	14.8	596,889	39.6	1,506,265
Total 1957	70,851,161	65.9	12,203,388	11.3	24,465,415	22.8	107,519,964
At merchant plants	6,512,102	53.8	1,799,759	14.9	3,780,442	31.3	12,092,303
At furnace plants	64,339,059	67.4	10,403,629	10.9	20,684,973	21.7	95,427,661
Total 1956	68,291,376	65.6	10,941,278	10.5	24,915,598	23.9	104,148,252

[1] High-volatile—dry volatile matter over 31 percent; medium-volatile—dry volatile matter 31 percent or less and over 22 percent; low-volatile—dry volatile matter 22 percent or less and over 14 percent.

TABLE 25.—Origin of coal obtained by coke-oven operators in the United States in 1957, by producing fields and volatile content, in net tons

State and field[1] where coal was produced	Volatile content[2]			Total
	High	Medium	Low	
Alabama	639,648	7,514,424		8,154,072
Arkansas			380,249	380,249
Colorado	1,402,901	218,349		1,621,250
Illinois	615,461			615,461
Indiana	3,013			3,013
Kentucky:				
Elkhorn	6,415,708			6,415,708
Harlan	6,284,024			6,284,024
Kenova-Thacker	502,580			502,580
New Mexico	14,169			14,169
Oklahoma	545,625	141,723	675,032	1,362,380
Pennsylvania:				
Anthracite			375,154	375,154
Bituminous:				
Central Pennsylvania	39,935		4,633,118	4,673,053
Connellsville	9,119,540			9,119,540
Freeport	3,644,151			3,644,151
Pittsburgh	15,345,679	573,166		15,918,845
Somerset			757,275	757,275
Westmoreland	273,829			273,829
Tennessee		209,994		209,994
Utah	2,924,229			2,924,229
Virginia:				
Buchanan	261,380	109,309		370,689
Clinch Valley		85,456		85,456
Pocahontas		1,064,382	712,409	1,776,791
Southwestern	1,535,129			1,535,129
West Virginia:				
Coal River	339,020			339,020
Fairmont	8,491,129			8,491,129
Kanawha	6,622,772	377,982		7,000,754
Kenova-Thacker	967,794			967,794
Logan	3,085,006	357,206		3,442,212
New River	491,610	525,829	646,752	1,664,191
Panhandle	10,972			10,972
Pocahontas		24,051	14,166,821	14,190,872
Randolph-Barbour	441,220	166,102		607,322
Tug River			74,677	74,677
Webster-Gauley	834,637	714,369		1,549,006
Winding Gulf		64,195	2,043,632	2,107,827
Canada		56,851	296	57,147
Total	70,851,161	12,203,388	24,465,415	107,519,964

[1] As defined by the U. S. Coal Commission of 1922.

[2] High-volatile—dry volatile matter over 31 percent; medium-volatile—dry volatile matter 31 percent or less and over 22 percent; low-volatile—dry volatile matter 22 percent or less and over 14 percent.

TABLE 26.—Origin and destination of coal delivered to oven-coke plants in the United States in 1957, by States, in net tons

Coal consumed in—	Coal produced in—							
	Alabama	Arkansas	Colorado	Illinois	Indiana	Kentucky	New Mexico	Oklahoma
Alabama	8,004,201	--------	--------	--------	------	--------	------	--------
California, Colorado, and Utah	--------	380,249	1,621,250	--------	------	--------	14,169	470,838
Illinois	--------	--------	--------	508,607	------	1,727,936	------	--------
Indiana	--------	--------	--------	104,259	3,013	5,951,250	------	--------
Kentucky, Tennessee, and Texas	149,871	--------	--------	--------	------	9,328	------	891,542
Maryland	--------	--------	--------	--------	------	1,029,236	------	--------
Massachusetts	--------	--------	--------	--------	------	555	------	--------
Michigan	--------	--------	--------	--------	------	1,128,870	------	--------
Minnesota	--------	--------	--------	--------	------	404,928	------	--------
New Jersey	--------	--------	--------	--------	------	--------	------	--------
New York	--------	--------	--------	--------	------	486,050	------	--------
Ohio	--------	--------	--------	--------	------	2,130,926	------	--------
Pennsylvania	--------	--------	--------	--------	------	250,246	------	--------
West Virginia	--------	--------	--------	--------	------	--------	------	--------
Connecticut, Missouri, and Wisconsin	--------	--------	--------	2,595	------	82,987	------	--------
Total 1957	8,154,072	380,249	1,621,250	615,461	3,013	13,202,312	14,169	1,362,380
At merchant plants	596,282	--------	--------	2,595	3,013	325,766	------	--------
At furnace plants	7,557,790	380,249	1,621,250	612,866	------	12,876,546	14,169	1,362,380
Total 1956	7,598,394	395,187	1,487,500	570,515	------	11,452,581	18,831	1,273,849

Coal consumed in—	Coal produced in—Continued						
	Pennsylvania	Tennessee	Utah	Virginia	West Virginia	Canada	Total
Alabama	22,923	102,260	--------	--------	260,543	------	8,389,927
California, Colorado, and Utah	--------	--------	2,924,229	--------	55	57,147	5,467,937
Illinois	5,019	--------	--------	136,891	1,649,556	------	4,028,009
Indiana	83,581	--------	--------	815,220	6,889,246	------	13,846,569
Kentucky, Tennessee, and Texas	16,665	107,734	--------	113,216	1,597,495	------	2,885,851
Maryland	482,630	--------	--------	--------	3,649,103	------	5,160,969
Massachusetts	23,116	--------	--------	--------	797,649	------	821,320
Michigan	551,677	--------	--------	428,962	2,884,625	------	4,994,134
Minnesota	14,639	--------	--------	--------	848,356	------	1,267,923
New Jersey	27,882	--------	--------	9,472	1,239,909	------	1,277,263
New York	3,646,140	--------	--------	414,433	1,125,804	------	5,672,427
Ohio	5,201,573	--------	--------	1,074,719	7,704,670	------	16,111,888
Pennsylvania	20,375,791	--------	--------	771,151	8,992,653	------	30,389,841
West Virginia	4,239,755	--------	--------	--------	1,459,886	------	5,699,641
Connecticut, Missouri, and Wisconsin	70,456	--------	--------	4,001	1,346,226	------	1,506,265
Total 1957	34,761,847	209,994	2,924,229	3,768,065	40,445,776	57,147	107,519,964
At merchant plants	904,758	--------	--------	225,061	10,034,828	------	12,092,303
At furnace plants	33,857,089	209,994	2,924,229	3,543,004	30,410,948	57,147	95,427,661
Total 1956	35,949,554	221,831	2,736,599	2,487,254	39,888,637	67,520	104,148,252

TABLE 27.—Quantity and percentage of captive coal received by oven-coke plants in the United States, 1947–49 (average) and 1953–57

Year	At merchant plants			At furnace plants			Total		
	Total coal received	Captive coal		Total coal received	Captive coal		Total coal received	Captive coal	
		Quantity	Percent		Quantity	Percent		Quantity	Percent
1947–49 (average)	18, 321, 004	5, 286, 361	28. 9	76, 138, 301	48, 371, 093	63. 5	94, 459, 305	53, 657, 454	56. 8
1953	15, 365, 899	5, 923, 998	38. 6	90, 710, 334	60, 121, 968	66. 3	106, 076, 233	66, 045, 966	62. 3
1954	9, 670, 190	4, 049, 080	41. 9	73, 615, 703	51, 828, 722	70. 4	83, 285, 893	55, 877, 802	67. 1
1955	12, 801, 963	5, 467, 619	42. 7	93, 865, 894	63, 205, 881	67. 3	106, 667, 857	68, 673, 500	64. 4
1956	13, 407, 253	5, 740, 551	42. 8	90, 740, 999	59, 378, 485	65. 4	104, 148, 252	65, 119, 036	62. 5
1957	12, 092, 303	5, 250, 574	43. 4	95, 427, 661	61, 543, 355	64. 5	107, 519, 964	66, 793, 929	62. 1

CONSUMPTION OF COKE

The apparent consumption of coke in the United States, allowing for imports, exports, and changes in producers' stocks, increased 2 percent over 1956 but was 4 percent below the alltime high of 1953. This overall increase over 1956 was due entirely to rising consumption in iron furnaces, as consumption for all other purposes decreased 15 percent. The use of coke for residential heating and gas manufacture was substantially reduced; the use of coke for other purposes dropped 51 percent from 1947–49 (average).

Iron furnaces consumed 92 percent of the national consumption of coke in 1957, but the tonnage used for this purpose was approximately 2 million tons lower than in 1953. Although coke consumption decreased, pig-iron production, including ferroalloys from blast furnaces but excluding ferroalloys made in electric furnaces, increased 3.5 million tons, owing to improvements in the fuel efficiency of blast furnaces. The quantity of coke required to produce 1 ton of metal in blast furnaces (pig iron and ferroalloys) was the lowest on record in 1957 and was 15.5 pounds less than in 1956 and 216.1 pounds or 11 percent less than in the base period, 1947–49. This decrease is most significant and means that the iron and steel industry reduced its requirements of metallurgical fuel 8,572,572 tons in 1957 from the quantity that blast furnaces would have used at the 1947–49 (average) fuel efficiency. Some factors contributing to this accomplishment by the iron and steel industry were enrichment of iron ores through beneficiation procedures, advancement in blast-furnace operating techniques (high-pressure tops, use of oxygen in blast, etc.), and the definite improvement in coke quality in the past few years. Better blending techniques and advanced coal-cleaning processes improved the chemical qualities and physical characteristics of blast-furnace coke.

Tables 30 and 31 summarize the disposal of oven and beehive coke in 1957, by major end uses. As indicated in table 30, a large part of the oven-coke output—particularly from furnace plants—is used by the producers in integrated blast furnaces; most coke made at merchant oven-coke plants and beehive plants is sold and shipped to other consumers. In 1957 merchant plants sold 80 percent of their production; beehive plants, most of their output; and furnace oven-coke plants, only 3 percent. Merchant plants supplied most of the coke used in iron foundries, for gas manufacture, in miscellaneous industrial applications, and for residential heating. Beehive coke was sold mostly for metallurgical purposes; 82 percent of the total shipments was destined to blast furnaces and iron foundries.

TABLE 28.—Apparent consumption of coke in the United States, 1947–49 (average) and 1953–57, in net tons

Year	Total production	Imports	Exports	Net change in stocks	Apparent United States consumption [1]	Consumption: Iron furnaces [2]		Consumption: All other purposes	
						Quantity	Percent	Quantity	Percent
1947–49 (average)	70,648,402	181,000	696,699	+280,230	69,852,473	55,877,463	80.0	13,975,010	20.0
1953	78,836,857	157,318	520,252	+778,051	77,695,872	69,596,514	89.6	8,099,358	10.4
1954	59,662,496	115,781	387,575	+269,132	59,121,570	51,741,260	87.5	7,380,310	12.5
1955	75,301,826	126,342	530,505	−1,248,069	76,145,732	68,506,721	90.0	7,639,011	10.0
1956	[3] 74,482,526	130,955	655,717	+633,670	[3] 73,324,094	65,289,270	[3] 89.0	[3] 8,034,824	[3] 11.0
1957	75,950,721	117,951	822,244	+814,335	74,432,093	67,580,507	90.8	6,851,586	9.2

[1] Production plus imports minus exports, plus or minus net change in stocks.
[2] American Iron and Steel Institute; figures include coke consumed in manufacturing ferroalloys.
[3] Revised figure.

TABLE 29.—Coke and coking coal consumed per net ton of pig iron produced in the United States, 1913, 1918, 1929, 1939, 1947–49 (average), and 1955–57

Year	Coke per net ton of pig iron and ferroalloys [1] (pounds)	Yield of coke from coal (percent)	Coking coal per net ton of pig iron and ferroalloys (pounds calculated)
1913	2,172.6	66.9	3,247.5
1918	2,120.7	66.4	3,193.8
1929	1,838.0	69.0	2,663.8
1939	1,778.0	69.8	2,547.3
1947–49 (av.)	1,919.7	69.7	2,754.2
1955	1,761.3	69.9	2,519.7
1956	1,719.1	70.1	2,452.4
1957	1,703.6	70.1	2,430.2

[1] American Iron and Steel Institute; consumption per ton of pig iron only, excluding furnaces making ferroalloys, was 2,172.6 pounds in 1913, 2,120.7 in 1918, 1,813.3 in 1929, 1,760.0 in 1939, 1,892.8 in 1947–49 (average), 1,745.9 in 1955, 1,699.7 in 1956, and 1,684.1 in 1957.

TABLE 30.—Oven coke produced, used by producers, and sold in the United States in 1957, by States

State	Produced		Used by producing companies—				Commercial sales	
			In blast furnaces		For other purposes [1]		To blast-furnace plant	
	Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value
Alabama	5, 919, 434	$110, 808, 402	5, 111, 607	$91, 657, 400	54, 479	$1, 471, 318	30, 517	(2)
California, Colorado, and Utah	3, 214, 807	75, 929, 139	3, 176, 140	75, 190, 668	7, 873	149, 370		
Illinois	2, 918, 015	55, 453, 391	2, 844, 066	53, 990, 665	70, 149	1, 522, 724	(2)	(2)
Indiana	9, 754, 559	214, 229, 291	9, 105, 948	198, 319, 470	14, 340	256, 584	54, 974	(2)
Kentucky, Tennessee, and Texas	2, 040, 468	32, 319, 015	904, 650	16, 233, 579	64, 993	1, 001, 742	(2)	(2)
Maryland	3, 430, 863	(2)	3, 453, 456	(2)	7, 382	(2)		
Massachusetts	554, 398	(2)	153, 845	(2)	8, 494	(2)	22, 942	(2)
Michigan	3, 707, 430	67, 391, 899	2, 778, 237	(2)	259, 715	5, 749, 960	(2)	(2)
Minnesota	916, 713	18, 977, 175	651, 083	(2)	3, 903	71, 179	90, 591	(2)
New Jersey	967, 526	(2)			104, 161	(2)	144, 452	(2)
New York	3, 995, 320	65, 270, 289	3, 287, 482	52, 039, 383	20, 862	388, 867	(2)	(2)
Ohio	11, 299, 353	198, 611, 442	9, 961, 356	173, 337, 659	139, 047	2, 890, 996	551, 463	$8, 820, 474
Pennsylvania	20, 082, 883	343, 692, 212	18, 329, 775	312, 863, 818	119, 084	1, 810, 003	744, 414	12, 144, 058
West Virginia	3, 938, 002	62, 071, 263	3, 287, 093	54, 052, 826	433, 715	4, 958, 913	(2)	(2)
Connecticut, Missouri, and Wisconsin	1, 120, 921	25, 205, 930			37, 799	665, 211	323, 362	5, 497, 755
Undistributed		82, 136, 712		116, 654, 691		2, 048, 592	2, 078, 963	38, 526, 879
Total 1957	73, 860, 692	1, 352, 096, 160	63, 044, 738	1, 144, 340, 159	1, 345, 996	22, 985, 459	4, 041, 678	64, 989, 166
At merchant plants	8, 685, 795	171, 754, 998	153, 845	(3)	994, 592	15, 050, 649	3, 237, 680	52, 212, 167
At furnace plants	65, 174, 897	1, 180, 341, 162	62, 890, 893	(3)	351, 404	7, 934, 810	803, 998	12, 776, 999
Total 1956	71, 992, 242	1, 274, 213, 780	59, 577, 960	1, 051, 966, 687	1, 788, 168	27, 410, 849	4, 663, 480	73, 205, 795

State	Commercial sales—Continued							
	To foundries		To other industrial plants [4]		For residential heating		Total	
	Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value
Alabama	467, 783	$12, 991, 540	227, 000	(2)	38, 770	$495, 678	764, 070	$17, 407, 859
California, Colorado, and Utah	540	(2)	51, 897	(2)	1, 113	(2)	53, 550	(2)
Illinois			49, 666	$530, 530	(2)	(2)	66, 682	827, 531
Indiana	378, 880	(2)	100, 721	1, 760, 303	38, 661	507, 659	573, 236	14, 094, 789
Kentucky, Tennessee, and Texas	(2)	(2)	48, 794	750, 084	(2)	(2)	1, 094, 435	15, 589, 703

Maryland	------	------	------	------	------	------	------	------
Massachusetts	74,151	(2)	117,398	(2)	131,471	(2)	345,962	(2)
Michigan	(2)	(2)	127,301	1,799,875	24,353	423,453	664,062	14,097,912
Minnesota	112,210	(2)	45,919	756,145	9,342	(2)	258,062	5,933,837
New Jersey	74,676	(2)	218,582	(2)	218,470	(2)	656,180	(2)
New York	(2)	(2)	53,950	752,612	(2)	(2)	713,602	13,304,059
Ohio	290,003	8,264,193	196,143	2,783,901	18,524	257,622	1,056,133	20,126,190
Pennsylvania	190,927	5,633,644	245,124	3,468,248	60,680	964,174	1,241,145	22,210,124
West Virginia	------	------	31,862	291,055	(2)	(2)	224,266	3,176,167
Connecticut, Missouri, and Wisconsin	403,532	12,139,967	107,936	1,968,987	111,231	1,852,150	946,061	21,458,859
Undistributed	340,347	28,084,125	------	10,666,502	7,811	6,803,524	------	20,708,107
Total 1957	2,333,049	67,113,469	1,622,293	25,528,242	660,426	11,304,260	8,657,446	168,935,137
At merchant plants	2,151,487	61,833,378	973,177	17,701,072	622,661	10,827,945	6,985,005	142,574,562
At furnace plants	181,562	5,280,091	649,116	7,827,170	37,765	476,315	1,672,441	26,360,575
Total 1956	2,659,236	70,478,947	1,766,537	25,347,084	905,920	14,764,253	9,995,173	183,796,079

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[1] Comprises 225,377 tons valued at $6,094,716 used in foundries; 112,928 tons, $1,753,798 to make producer gas; 516,189 tons, $6,377,646 to make water gas; and 491,502 tons, $8,759,299 for other purposes.

[2] Included with "Undistributed" to avoid disclosing individual company figures.

[3] Concealed to avoid disclosing individual company figures.

[4] Includes 99,409 tons valued at $1,842,283 to water-gas plants.

TABLE 31.—Beehive coke produced, used by producers, and sold in the United States in 1957, by States

State	Produced		Used by producing companies—				Commercial sales	
			In blast furnaces		For other purposes		To blast-furnace plants	
	Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value
Pennsylvania	1,617,466	$23,324,155	(1)	(1)	--------	--------	[2] 1,410,885	$20,716,813
Virginia	202,958	3,051,195	--------	--------	--------	--------	131,899	2,047,994
Kentucky, Utah, and West Virginia	269,605	4,816,125	--------	--------	--------	--------	140,798	1,993,968
Total 1957	2,090,029	31,191,475	(1)	(1)	--------	--------	[2] 1,683,582	24,758,775
Total 1956	[3] 2,490,284	[3] 35,251,941	335,531	$4,858,485	--------	--------	[3] 1,767,899	[3] 24,762,743

State	Commercial sales—Continued							
	To foundries		To other industrial plants		For residential heating		Total	
	Net tons	Value	Net tons	Value	Net tons	Value	Net tons	Value
Pennsylvania	27,803	$473,460	175,124	$2,083,650	1,714	$16,556	1,615,526	$23,290,479
Virginia	2,078	33,214	67,996	955,221	485	6,927	202,458	3,043,356
Kentucky, Utah, and West Virginia	553	11,651	130,406	2,842,998	--------	--------	271,757	4,848,617
Total 1957	30,434	518,325	373,526	5,881,869	2,199	23,483	2,089,741	31,182,452
Total 1956 [4]	42,109	699,627	327,715	4,717,467	8,648	106,465	2,146,371	30,286,302

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[1] Included with sales of blast-furnace coke to avoid disclosing individual company figures.
[2] Includes small quantity used by producers.
[3] Revised figure.
[4] Revised figures.

DISTRIBUTION OF OVEN AND BEEHIVE COKE

Distribution of coke and breeze in 1957, by States and major uses, is summarized in table 32. Coke is used principally as an industrial fuel, particularly in the iron and steel industry, and the location of iron-producing centers governs the distribution for coke. Heavy concentration of iron-blast furnaces near Pittsburgh, Chicago, Cleveland, Buffalo, and Birmingham and in the Ohio Valley makes these areas the principal centers of coke consumption. In 1957 approximately 92 percent of all coke consumed in the United States was used at blast-furnace plants for smelting iron ore. Blast-furnace coke was used in 18 States; over half was consumed in Pennsylvania, Ohio, and Indiana. Most blast-furnace installations are huge enterprises that require large quantities of coke. For example, the largest blast-furnace plant in the United States consumed as much coke as was required by all other industrial applications combined. Another important use of coke is for melting iron and steel in foundry cupolas. The total quantity used for this purpose was only a fraction of that used in blast furnaces, and the geographic distribution was more widespread. All States except Nevada and Wyoming used varying quantities of foundry coke. Michigan, the center of the automotive industry, used one-fifth of all foundry coke consumed in the United

States in 1957. The decline in production of castings in the automotive, farm-machinery, machine-tool, heavy-machinery, railroad, and electrical-equipment industries reduced the demand for foundry coke, and the total distribution in 1957 was 12 percent below the quantity distributed in 1956.

The use of coke in making producer gas and water gas dropped for the 9th consecutive year (10 years for producer gas) and was only 16 percent as much as was used for these purposes during post-World War II years 1947–49. Coke shipments "to other industrial plants" covered a wide variety of uses such as nonferrous smelting, lime burn-

TABLE 32.—Distribution of oven and beehive coke and breeze in 1957, in net tons

[Based upon reports from producers showing destination and principal end use of coke used or sold. Does not include imported coke, which totaled 117,951 tons in 1957]

Consuming State	Coke							Breeze
	To blast-furnace plants	To foundries	To producer-gas plants	To water-gas plants	To other industrial plants	For residential heating	Total	
Alabama	4, 882, 796	175, 036	---------	---------	49, 848	13, 001	5, 120, 681	291, 455
Arizona	---------	182	---------	---------	104	---------	286	595
Arkansas	---------	1, 774	---------	---------	3, 245	---------	5, 019	---------
California	997, 359	60, 254	---------	---------	55, 452	---------	1, 113, 065	66, 884
Colorado	771, 559	15, 547	---------	---------	27, 868	50	815, 024	78, 826
Connecticut	---------	32, 776	37, 794	10, 581	1, 577	58, 032	140, 760	44, 917
Delaware	---------	1, 968	---------	---------	304	91	2, 363	---------
District of Columbia	---------	62	---------	---------	---------	---------	62	---------
Florida	---------	3, 528	---------	14, 892	15, 959	490	34, 869	36, 118
Georgia	---------	10, 354	---------	---------	3, 035	5, 781	19, 170	702
Idaho	---------	397	---------	---------	64, 252	67	64, 716	76, 825
Illinois	5, 376, 431	223, 141	---------	---------	40, 789	27, 131	5, 667, 492	178, 535
Indiana	7, 545, 020	150, 044	---------	6, 130	78, 348	31, 878	7, 811, 420	372, 138
Iowa	---------	42, 106	---------	---------	13, 989	1, 671	57, 766	3, 104
Kansas	---------	11, 520	---------	---------	441	---------	11, 961	1
Kentucky	617, 665	33, 752	---------	---------	192, 381	3, 869	847, 667	38, 695
Louisiana	---------	3, 936	---------	---------	62, 250	218	66, 404	252
Maine	---------	3, 244	---------	18, 603	208	7, 574	29, 629	---------
Maryland	3, 453, 456	19, 010	---------	---------	13, 487	11	3, 485, 964	212, 887
Massachusetts	153, 845	44, 324	---------	19, 835	11, 822	133, 715	363, 541	48, 151
Michigan	3, 202, 133	501, 584	---------	---------	166, 126	17, 414	3, 887, 257	159, 509
Minnesota	598, 547	24, 367	---------	2, 426	19, 211	8, 225	652, 776	50, 702
Mississippi	---------	1, 117	---------	---------	41	---------	1, 158	31
Missouri	---------	56, 637	---------	---------	26, 453	134	83, 224	1, 519
Montana	---------	1, 356	---------	---------	17, 673	---------	19, 029	22, 023
Nebraska	---------	3, 889	---------	---------	5, 208	---------	9, 097	232
Nevada	---------	---------	---------	---------	9, 433	42	9, 475	---------
New Hampshire	---------	2, 728	---------	---------	55	7, 329	10, 112	---------
New Jersey	---------	70, 269	41, 361	61, 249	77, 482	162, 160	412, 521	101, 727
New Mexico	---------	687	---------	---------	83	195	965	---------
New York	4, 340, 470	124, 213	---------	---------	122, 044	57, 484	4, 644, 211	261, 198
North Carolina	---------	16, 174	---------	3, 838	10, 143	2, 701	32, 856	26, 194
North Dakota	---------	265	---------	---------	220	219	704	---------
Ohio	12, 786, 863	329, 954	---------	6, 384	281, 993	16, 125	13, 421, 319	733, 225
Oklahoma	---------	5, 017	---------	---------	2, 457	---------	7, 474	7, 463
Oregon	---------	4, 671	---------	---------	19, 557	---------	24, 228	1, 391
Pennsylvania	19, 331, 540	179, 044	33, 768	17, 187	419, 256	57, 395	20, 038, 190	1, 038, 336
Rhode Island	---------	9, 604	---------	---------	193	12, 104	21, 901	---------
South Carolina	---------	5, 383	---------	---------	19, 340	728	25, 451	9, 096
South Dakota	---------	483	---------	---------	563	78	1, 124	---------
Tennessee	209, 429	82, 474	---------	---------	114, 827	1, 655	408, 385	194, 861
Texas	762, 233	57, 223	---------	---------	92, 062	1, 146	912, 664	79, 738
Utah	1, 408, 229	15, 200	---------	---------	30, 983	996	1, 455, 408	102, 018
Vermont	---------	3, 775	---------	---------	171	1, 964	5, 910	---------
Virginia	143, 164	42, 140	---------	---------	39, 738	219	225, 261	2, 206
Washington	---------	6, 707	---------	---------	6, 969	---------	13, 676	3, 933
West Virginia	1, 926, 809	10, 129	---------	432, 947	20, 395	84	2, 390, 364	204, 830
Wisconsin	---------	123, 897	5	---------	11, 409	22, 484	157, 795	25, 533
Wyoming	---------	---------	---------	---------	2, 483	---------	2,483	123
Total	68, 507, 548	2, 511, 942	112, 928	594, 072	2, 151, 927	654, 460	74, 532, 877	4, 475, 973
Exported	262, 450	76, 918	---------	23, 981	233, 530	8, 165	605, 044	31, 166
Grand total	68, 769, 998	2, 588, 860	112, 928	618, 053	2, 385, 457	662, 625	75, 137, 921	4, 507, 139

ing, beet-sugar refining, manufacturing calcium carbide, rock wool, etc.; every State in the Union used some coke for industrial purposes. Pennsylvania, Ohio, and Kentucky led all States in consumption of "other industrial coke" and combined used 42 percent of the United States total. The use of coke for residential heating continued to trend downward, and the quantity used was only about 1 percent of the total shipments for all purposes. For many years the residential-heating trade was the second largest outlet for coke, furnishing as much as one-fourth of the total distribution.

STOCKS OF COKE AND COKING COAL

Coke.—Stocks of oven coke increased 35 percent during 1957 and on December 31 reached the highest figure in 19 years. Coke stocks usually increase when steel production decreases. The sharp dip in steel production in the latter half of 1957 reduced coke requirements, and stocks of oven coke increased an average of more than 100,000 tons per month from the end of June until the end of December. Beehive coke is rarely stocked by producing companies, and stock changes were not significant.

Oven-coke stocks increased at both merchant and furnace plants. Stocks at merchant plants more than doubled in 1957 and on December 31 were equivalent to 45 days' production. During periods of reduced steel-operating rates, purchases of blast-furnace coke from merchant plants are curtailed by the iron and steel companies, and stocks build

TABLE 33.—Producers' stocks of coke and breeze in the United States on Dec. 31, 1957, by States, in net tons

State	Coke				Breeze
	Blast furnace	Foundry	Residential heating and other	Total	
Oven coke:					
Alabama	353,533	9,848	32,079	395,460	36,441
California, Colorado, and Utah	189,056	-----	-----	189,056	21,563
Illinois	41,062	-----	1,174	42,236	38,083
Indiana	239,338	1,745	8,398	249,481	682,889
Kentucky, Tennessee, and Texas	25,341	3,097	12,120	40,558	16,640
Maryland	74,893	-----	-----	74,893	46,888
Massachusetts	39,328	730	90,117	130,175	-----
Michigan	41,711	3,847	12,853	58,411	7,260
Minnesota	13,766	7,063	19,814	40,643	10,534
New Jersey	127,798	975	140,259	269,032	14,709
New York	66,717	-----	616	67,333	109,380
Ohio	423,700	14,516	28,562	466,778	103,647
Pennsylvania	836,419	11,107	11,052	858,578	241,438
West Virginia	21,505	-----	10,410	31,915	9,790
Connecticut, Missouri, and Wisconsin	74,961	54,450	92,862	222,273	7,480
Total 1957	2,569,128	107,378	460,316	3,136,822	1,346,742
At merchant plants	449,224	89,916	414,903	954,043	80,474
At furnace plants	2,119,904	17,462	45,413	2,182,779	1,266,268
Total 1956	2,014,528	63,067	244,980	2,322,575	940,902
Beehive coke:					
Pennsylvania	9,050	-----	-----	9,050	-----
Virginia	1,386	-----	370	1,756	100
Kentucky, Utah, and West Virginia	155	-----	993	1,148	110
Total 1957	10,591	-----	1,363	11,954	210
Total 1956	10,431	-----	1,435	11,866	144

up. Although stocks at furnace plants increased over 1956, the gain in volume was only about one-half as large as at merchant plants, and reserves on hand at the end of the year were equivalent to only 15 days' production.

Coking Coal.—Stocks of bituminous coal at oven-coke plants increased slightly in 1957 and at the end of the year were enough for 60 days' supply at the prevailing rate of consumption. Coal stocks are extremely important to oven-coke-plant operators because of the continuous nature of the carbonizing process, and an adequate coal

TABLE 34.—Producers' month-end stocks of oven coke in the United States, 1956–57, in net tons

[Includes blast-furnace, foundry, and residential heating coke]

Month	Merchant plants		Furnace plants		Total	
	1956	1957	1956	1957	1956	1957
January	215, 281	303, 490	1, 433, 392	1, 792, 883	1, 648, 673	2, 096, 373
February	155, 291	249, 672	1, 479, 398	1, 765, 432	1, 634, 689	2, 015, 104
March	138, 953	307, 878	1, 534, 695	1, 800, 269	1, 673, 648	2, 108, 147
April	176, 269	396, 207	1, 566, 503	1, 757, 733	1, 742, 772	2, 153, 940
May	238, 311	493, 525	1, 650, 097	1, 766, 189	1, 888, 408	2, 259, 714
June	295, 124	553, 193	1, 643, 915	1, 742, 738	1, 939, 039	2, 295, 931
July	448, 827	641, 527	2, 184, 779	1, 781, 067	2, 633, 606	2, 422, 594
August	526, 140	715, 929	2, 436, 797	1, 828, 977	2, 962, 937	2, 544, 906
September	506, 686	783, 086	2, 304, 146	1, 815, 599	2, 810, 832	2, 598, 685
October	477, 018	817, 433	2, 107, 352	1, 946, 524	2, 584, 370	2, 763, 957
November	438, 658	868, 042	2, 003, 412	2, 095, 020	2, 442, 070	2, 963, 062
December	401, 690	954, 043	1, 920, 885	2, 182, 779	2, 322, 575	3, 136, 822

TABLE 35.—Month-end stocks of bituminous coal at oven-coke plants in the United States, 1953–57, in net tons

Month	1953	1954	1955	1956	1957
January	13, 400, 118	14, 885, 244	11, 506, 274	12, 561, 742	12, 796, 209
February	13, 381, 865	14, 729, 885	11, 065, 243	12, 341, 898	12, 801, 976
March	13, 278, 027	13, 886, 998	10, 776, 055	12, 839, 544	13, 254, 278
April	13, 408, 394	12, 856, 055	10, 693, 689	12, 865, 107	13, 285, 465
May	13, 898, 342	12, 595, 826	11, 515, 962	13, 605, 645	13, 895, 620
June	14, 537, 894	12, 659, 445	12, 745, 576	14, 004, 567	13, 978, 054
July	13, 220, 760	11, 125, 064	12, 342, 332	13, 060, 538	11, 717, 007
August	14, 698, 394	11, 571, 296	13, 665, 828	13, 366, 033	12, 503, 701
September	15, 910, 098	11, 869, 082	13, 993, 102	13, 521, 835	13, 006, 022
October	16, 609, 099	12, 192, 655	13, 892, 194	14, 005, 637	13, 935, 303
November	16, 719, 776	12, 484, 403	13, 603, 970	14, 093, 446	14, 002, 603
December	16, 485, 527	12, 356, 618	13, 342, 972	13, 893, 561	14, 092, 205

TABLE 36.—Month-end stocks of anthracite at oven-coke plants in the United States, 1953–57, in net tons

Month	1953	1954	1955	1956	1957
January	44, 803	72, 594	46, 725	57, 683	129, 330
February	35, 389	63, 369	37, 982	41, 748	127, 418
March	32, 513	54, 288	26, 745	29, 469	119, 472
April	33, 480	48, 211	31, 861	30, 301	114, 369
May	44, 524	37, 244	40, 726	40, 024	110, 412
June	58, 561	45, 822	53, 248	52, 716	125, 664
July	57, 989	44, 525	55, 974	59, 886	111, 649
August	60, 010	47, 788	55, 529	95, 156	134, 686
September	61, 559	44, 858	59, 886	85, 754	147, 258
October	70, 066	50, 736	63, 243	113, 610	145, 879
November	74, 386	56, 856	73, 281	138, 879	145, 051
December	79, 381	54, 130	80, 464	146. 581	138, 085

supply is imperative to insure continuous operation. A 30-day supply of bituminous coal is generally considered the minimum, but the supply of coal at coke plants has not dropped below 38 days' requirements since April 1955. Stocks in July dropped to the lowest point in more than 2 years and yet were enough for 40 days' supply.

ASSIGNED VALUE AND PRICE

Tables 37 and 38 show the value assigned to beehive and oven coke produced by coke-producing companies and average prices for com-

TABLE 37.—Average value per net ton of coke produced and average receipts per net ton from coke sold (commercial sales) in the United States, 1947–49 (average) and 1953–57

Year	Value per ton produced [1]			Receipts per ton sold		
	Oven coke	Beehive coke	Total	Oven coke	Beehive coke	Total
1947–49 (average)	$12.08	$11.32	$12.02	$13.87	$11.95	$13.41
1953	14.68	14.54	14.67	17.75	14.76	17.07
1954	15.93	14.16	15.91	17.19	13.46	16.98
1955	16.30	12.94	16.23	16.80	12.88	16.28
1956	17.70	[2] 14.16	17.58	18.39	14.11	17.64
1957	18.31	14.92	18.21	19.51	14.90	18.71

[1] Beginning in 1954, figures are based on market values and therefore not comparable with values shown for preceding years.
[2] Revised figure.

TABLE 38.—Average receipts per net ton of coke sold (commercial sales) in the United States in 1957, by States

State	Oven coke				Beehive coke			
	To blast-furnace plants	To foundries	To other industrial plants [1]	For residential heating	To blast-furnace plants	To foundries	To other industrial plants [1]	For residential heating
Alabama	(2)	$27.77	$15.16	$12.79	--------	--------	--------	--------
California, Colorado, Texas, and Utah	--------	(2)	19.76	21.05	--------	--------	(2)	--------
Connecticut, Massachusetts, New Jersey, and New York	$17.79	27.87	17.56	18.16	--------	--------	--------	--------
Illinois	(2)	--------	10.68	14.33	--------	--------	--------	--------
Indiana	(2)	(2)	17.48	13.13	--------	--------	--------	--------
Kentucky, Missouri, and Tennessee	13.81	31.04	18.37	(2)	(2)	--------	(2)	--------
Michigan, Minnesota, and Wisconsin	17.60	29.12	15.18	17.31	--------	--------	--------	--------
Ohio	15.99	28.50	14.19	13.91	--------	--------	--------	--------
Pennsylvania	16.31	29.51	14.15	15.89	$14.59	$17.03	$11.90	$9.66
Virginia	--------	--------	--------	--------	15.53	15.98	14.05	14.28
West Virginia	14.99	--------	9.13	(2)	(2)	21.07	(2)	--------
Undistributed	17.34	28.61	--------	16.64	14.16	--------	21.80	--------
United States average, 1957	16.08	28.77	15.74	17.12	14.63	17.03	15.75	10.68
At merchant plants	16.13	28.74	18.19	17.39	--------	--------	--------	--------
At furnace plants	15.89	29.08	12.06	12.61	--------	--------	--------	--------
United States average, 1956	15.70	26.50	14.35	16.30	[3] 14.01	[3] 16.61	[3] 14.40	[3] 12.31

[1] Includes coke sold to water-gas plants.
[2] Included with "Undistributed" to avoid disclosing individual company figures.
[3] Revised figure.

mercial sales in 1957 (see Scope of Report for an explanation of value and price). The average values per ton of oven and beehive coke were the highest on record in 1957. Because of increased manufacturing costs (coal and labor), the average value of oven coke increased 3 percent and of beehive coke, 5 percent (see table 37). The average receipts per ton of oven and beehive coke sold also followed the increases in coal costs, and the average for each type of coke rose 6 percent. Average receipts or prices per ton of coke sold for all principal uses except beehive coke for residential heating increased. The greatest gain, an increase of $2.27 per ton (9 percent), was made by oven foundry coke.

TABLE 39.—Average monthly prices per net ton of furnace and foundry beehive coke and foundry oven coke in the United States in 1957 [1]

	January	February	March	April	May	June
Beehive coke, at ovens:						
Connellsville furnace	$14.50-15.50	$14.75-15.75	$14.75-15.75	$14.75-15.75	$14.75-15.75	$14.75-15.75
Connellsville foundry	17.50-18.50	17.50-18.50	17.50-18.50	17.50-18.50	17.50-18.50	17.50-18.50
Oven foundry coke, at ovens:						
Birmingham	27.60	28.85	28.85	28.85	28.85	28.85
Detroit	29.50	30.50	30.50	30.50	30.50	30.50
Everett [2]	30.55	31.55	31.55	31.55	31.55	31.55
Indianapolis	29.75	29.75	29.75	29.75	29.75	29.75
Kearny	30.00	30.00	29.75	29.75	29.75	29.75
Milwaukee	30.50	30.50	30.50	30.50	30.50	30.50
Painesville	30.50	30.50	30.50	30.50	30.50	30.50
Philadelphia	29.50	29.50	29.50	29.50	29.50	29.50
St. Louis	31.50	31.50	31.50	31.50	31.50	31.50
St. Paul	29.75	29.75	29.75	29.75	29.75	29.75
Swedeland	29.50	29.50	29.50	29.50	29.50	29.50

	July	August	September	October	November	December
Beehive coke, at ovens:						
Connellsville furnace	$14.75-15.75	$14.75-15.75	$14.75-15.75	$14.75-15.75	$14.75-15.75	$14.75-15.75
Connellsville foundry	18.00-18.50	18.00-18.50	18.00-18.50	18.00-18.50	18.00-18.50	18.00-18.50
Oven foundry coke, at ovens:						
Birmingham	28.85	28.85	28.85	28.85	28.85	28.85
Detroit	30.50	30.50	30.50	30.50	30.50	30.50
Everett [2]	31.55	31.55	31.55	31.55	31.55	31.55
Indianapolis	29.75	29.75	29.75	29.75	29.75	29.75
Kearny	29.75	29.75	29.75	29.75	29.75	29.75
Milwaukee	30.50	30.50	30.50	30.50	30.50	30.50
Painesville	30.50	30.50	30.50	30.50	30.50	30.50
Philadelphia	29.50	29.50	29.50	29.50	29.50	29.50
St. Louis	31.50	31.50	31.50	31.50	31.50	31.50
St. Paul	29.75	29.75	29.75	29.75	29.75	29.75
Swedeland	29.50	29.50	29.50	29.50	29.50	29.50

[1] As quoted by Steel magazine.
[2] New England delivered or within $4.55 (January-March), $4.80 (April-August), and $4.85 (September-December) freight zone from works.

FOREIGN TRADE [1]

Imports.—Coke imports declined slightly from 1956 and were equivalent to approximately ½ day's production. When compared with total United States consumption, the small tonnage imported appeared unimportant, but nevertheless it was vital to certain areas where no other coke was available. Canada supplied all coke imported, except a small quantity from West Germany and 8 tons (which was probably used for experimental or special purposes) from the United Kingdom.

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[1] Figures on imports and exports compiled by Mae B. Price and Elsie D. Jackson, Division of Foreign Activities, Bureau of Mines, from records of the Bureau of the Census.

About two-thirds of the Canadian imports entered the United States through the Montana-Idaho customs district. Although no information was available on the end uses of this coke, it was probably used for smelting nonferrous metals and in the electrochemical industries of the Northwest.

Exports.—Exports of coke from the United States increased 25 percent over 1956 and were the highest since 1951. Canada received three-quarters of the United States exports (most of it passed through the Buffalo and Michigan customs districts) for use mostly in metallurgical applications—chiefly blast furnaces and iron foundries. Exports to Mexico, principally for foundry use and nonferrous smelting, increased slightly. Shipments to Cuba were only about half as large as in 1956.

Exports to South America almost tripled over those in 1956 and were the highest since 1918. Argentina and Brazil, where industrialization was advancing rapidly, received 99 percent of the coke shipped to South America. Exports to all other South American countries combined totaled slightly over 1 thousand tons.

Exports to Europe dwindled to less than 10 thousand tons in 1957 and were the smallest since 1950. Increased production of coke in the principal coke-producing countries in Western Europe in 1957 made more coke available to those European countries deficient in coke resulting in decreased demand for United States coke.

TABLE 40.—Coke imported for consumption in the United States, 1955–57, by countries and customs districts

[Bureau of the Census]

	1955		1956		1957	
	Net tons	Value	Net tons	Value	Net tons	Value
COUNTRY						
North America: Canada	125,955	$1,393,530	129,952	$1,450,273	117,641	$1,526,787
Europe:						
Germany, West	387	11,720	1,003	20,403	302	16,312
United Kingdom	----------	----------	----------	----------	8	420
Total	387	11,720	1,003	20,403	310	16,732
Grand total	126,342	1,405,250	130,955	1,470,676	117,951	1,543,519
CUSTOMS DISTRICT						
Buffalo	2,513	25,290	12,132	149,776	12,056	193,720
Chicago	----------	----------	29	345	----------	----------
Connecticut	33	393	----------	----------	----------	----------
Dakota	7,177	56,985	4,319	44,287	4,167	42,911
Duluth and Superior	----------	----------	43	383	1,629	25,735
Galveston	----------	----------	----------	----------	45	739
Hawaii	387	11,720	193	9,384	302	16,312
Laredo	75	1,096	----------	----------	----------	----------
Maine and New Hampshire	2,188	11,886	6,787	36,404	177	3,063
Michigan	32,474	362,451	32,597	293,399	27,929	271,122
Montana and Idaho	79,846	924,773	71,155	898,907	71,341	985,158
New York	----------	----------	----------	----------	8	420
St. Lawrence	----------	----------	----------	----------	14	266
Vermont	161	2,637	88	1,940	193	3,375
Washington	1,488	8,019	3,612	35,851	90	698
Total	126,342	1,405,250	130,955	1,470,676	117,951	1,543,519

TABLE 41.—Coke exported from the United States, 1955–57, by countries and customs districts

	1955		1956		1957	
	Net tons	Value	Net tons	Value	Net tons	Value
COUNTRY						
North America:						
Canada	361,114	$5,749,270	465,558	$7,605,280	628,950	$10,230,477
Mexico	18,806	266,543	9,924	203,919	11,846	206,895
Panama	25	1,803	96	6,597	100	7,272
West Indies:						
Cuba	21,014	393,602	33,353	647,091	14,465	384,418
Trinidad and Tobago	229	5,535	60	1,300	125	4,064
Other West Indies	62	3,538	50	9,418	238	11,031
Other North America	207	7,434	211	13,995	214	7,717
Total	401,457	6,427,725	509,252	8,487,600	655,938	10,851,874
South America:						
Argentina	21,141	350,187	35,817	745,738	53,932	1,156,174
Bolivia	199	8,086	1,250	46,584	-	-
Brazil	187	4,890	74	13,472	46,488	987,523
Chile	791	21,053	819	27,015	634	22,993
Ecuador	164	11,548	162	8,850	192	11,435
Peru	50	1,725	163	6,576	181	7,861
Uruguay	234	5,483	-	-	-	-
Venezuela	147	8,684	249	11,802	92	4,404
Other South America	12	1,147	-	-	344	7,877
Total	22,925	412,803	38,534	860,037	101,863	2,198,267
Europe:						
Belgium-Luxembourg	-	-	2,236	47,904	-	-
Denmark	17,258	274,629	2,572	47,546	-	-
Finland	-	-	-	-	99	3,183
Germany, West	-	-	8,091	160,609	15	1,515
Greece	5,539	84,711	-	-	2,029	42,778
Norway	-	-	5,002	105,027	-	-
Spain	32,336	352,931	-	-	-	-
Sweden	-	-	31,265	601,048	7,383	152,920
Total	55,133	712,271	49,166	962,134	9,526	200,396
Asia:						
Israel	1,130	19,334	250	4,500	-	-
Japan	-	-	1,026	10,901	27,326	480,543
Korea, Republic of	-	-	-	-	2,460	89,680
Pakistan	7,390	110,846	-	-	-	-
Philippines	100	4,750	893	28,500	799	25,331
Total	8,620	134,930	2,169	43,901	30,585	595,554
Oceania: French Pacific Islands	42,370	550,350	56,596	1,114,592	24,332	510,403
Grand total	530,505	8,238,079	655,717	11,468,264	822,244	14,356,494
CUSTOMS DISTRICT						
Buffalo	68,491	1,229,846	46,926	824,574	196,837	3,571,046
Dakota	23,449	471,927	8,489	222,393	13,830	367,046
Duluth and Superior	6,650	178,322	4,586	98,167	12,842	277,655
Florida	2,397	75,131	2,505	83,389	2,555	92,117
Laredo	4,150	106,920	3,892	121,927	3,222	112,013
Los Angeles	7,723	58,467	4,739	34,388	19,797	175,276
Maryland	561	12,462	696	21,448	7,817	170,000
Massachusetts	-	-	60,880	1,200,148	69,393	1,445,938
Michigan	199,968	3,340,223	123,038	2,199,835	323,441	5,191,596
Mobile	1,808	44,808	11,135	282,392	3,810	118,059
New Orleans	827	41,988	12,788	296,475	2,096	87,581
New York	20,053	312,731	36,747	692,663	17,293	447,463
Ohio	36,416	263,930	46,637	296,972	44,000	301,400
Philadelphia	124,632	1,725,892	46,105	886,722	48,540	1,031,323
St. Lawrence	15,516	107,540	8,813	141,048	10,011	183,851
San Diego	777	19,693	448	15,598	625	20,815
San Francisco	100	4,750	1,271	28,474	-	-
Virginia	245	5,871	9,207	184,844	2,682	57,963
Washington	2,240	61,112	2,122	65,861	2,971	88,880
Other districts	14,502	176,466	224,693	3,770,946	40,482	616,472
Total	530,505	8,238,079	655,717	11,468,264	822,244	14,356,494

TECHNOLOGY

In 1957 much study and research on coal carbonization problems were devoted to processes and techniques for preparing coals and blends for coking. Washing, crushing, blending, compacting, or stamping of the coals before charging into the ovens are some of the steps in preparing coal for carbonization and are employed to some extent in virtually all the major coke-producing countries of the world. Dwindling reserves of premium-quality coking coals in many areas and rapid advancement in mechanizing mines has given great impetus to coal preparation. For example, 72 percent of all coal carbonized in the United States in 1957 was washed before being charged into the ovens, with beneficial effects on both the chemical composition and physical structure of the coke.

Blending, an important step in preparing coal for coking, has 1 or more of the following 4 main objectives: (1) Improving the physical quality and uniformity of the coke, (2) controlling the pressure developed in the coke ovens by the carbonizing process, (3) controlling the yield of the products, (4) and broadening the use of coking coals. For many years the Bureau of Mines has studied the effects of blending various coals and even inerts on the coke produced and has published a number of papers on these studies. Today most producers that have pilot-scale-test ovens experiment with various blends of coal, using the result to guide them in blending for their commercial ovens.

Virtually all of the major coke-producing countries of the world crush or pulverize the coals before coking—the proper degree of pulverization or crushing makes better coke. Compacting or stamping the coals before charging into ovens increases bulk density but is not practiced to any extent in the United States, although extensively used in Europe. The bulk density of the charge may also be increased by adding oil or by controlling the moisture content.

A report summarizing methods of preparing coking mixtures, carbonizing techniques, and composition of various coals and coal blends in various countries reviews laboratory tests for selecting coals for carbonization in different countries and describes special or extraordinary coking methods (drying, stamping, blending) in each country.[2]

The Burstlein process of preparing coal for coking has received much attention in recent years. Developed by Eugene Burstlein, this process was first placed in full-scale operation in 1951 at the Thionville coke plant in France. This patented process is based on the principle that the petrographic constituents of the individual coals used in a blend vary widely in coking power, hardness, and grain size. Therefore uniform size of the coal particles and homogeneous texture of the blend is obtained by selectively screening and crushing the petrographic constituents. This process is in marked contrast to conventional crushing, which tends to make the soft petrographic constituents (vitrain and clarain) too fine while leaving the harder particles, such as durain and shale, too coarse. The Burstlein process avoids crushing the friable or softer constituents too finely and yet crushes the harder or infusible constituents to a given narrow size range. Thus when various combinations of screens and crushers are used, all constituents of the blend will be of uniform size. The development of an electrically heated screen for screening the moist fine coal was important in this process.

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[2] Secretariat of the Industry Division of the Economic Commission for Europe, Rational Utilization of European Coal Availabilities for Carbonization Purposes: United Nations, Geneva, Switzerland, August 1957, 76 pp.

By 1957, the original plant at Thionville, France, and 9 others were using the Burstlein process: 5 plants in France, 1 each in Germany and Italy, and 2 in North Africa.

The petrographic preparation of coal for coking was studied also in the Soviet Union, and tests were conducted on certain low-rank weakly coking coals of the Donets Basin after selective grinding and separation of their petrographic constituents.

In September 1957 the Coal and Coke Research Committee of the American Coke and Coal Chemicals Institute held a joint meeting in Pittsburgh, Pa., with a delegation from the British Coke Research Association. A highlight of the meeting was a discussion of recent British work concerning the effect of coking pressure on the full-scale operation of coke-oven plants. The British workers had found establishing a safe upper limit of pressure as indicated by test ovens difficult because the strength of a large-scale coke-oven wall at operating temperatures was not known. The rebuilding program of the Guest Keen Iron and Steel Co., Ltd., made it possible for a short time to test to destruction ovens that were in good condition. Before these tests the British Coke Research Association had adopted as a safety limit coal or coal blends that exerted a maximum pressure of less than 2 pounds per square inch when tested under standard conditions (bulk density dry, 52–54 pounds per cubic foot) in the movable-wall oven. The tests in the full-scale ovens confirmed 2 pounds per square inch as a safety limit for expanding coals. This safety limit was in line with the practice in the United States of Koppers Co., Inc., which uses a safety limit of 1.5 pounds per square inch in its test ovens. Coal that produces pressures higher than 1.5 but less than 2 pounds per square inch is not recommended for regular use in ovens over 10 feet high.

The Center of Study and Research of the Charbonnages de France (Cerchar) in recent years has conducted some outstanding work on the kinetics or the mechanism of coking. Investigative studies in the laboratory at Verneuil, France, and at the experimental coking plant at Marienau were the basis of the Sixth Coal Science Lecture given by Raymond Cheradame, Technical Director-General of Cerchar, to the British Coal Utilisation Research Association in London on October 16, 1957.[3]

Carbonization research by the Federal Bureau of Mines in 1957 included studies relating to kinetics and mechanisms of coking, preheating of coals before carbonization, carbonizing properties of petrographic constituents, expansion, bulk density, and operating variables that affect carbonization, such as oven width, rate of heating, quenching of coke, etc. It continued to survey preparation characteristics and carbonizing properties of American coals and published several reports giving preparation or carbonizing properties of eastern coking coals, by counties. A brief summary of the study and research in 1957 will be published in the 1957 Bureau of Mines annual report on Research and Technologic work on coal and related investigations.

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[3] Cheradame, Raymond, From Coal to Coke: British Coal Utilisation Research Assoc., B. C. U. R. A. Quart. Gazette, No. 33, 1957, pp. 1–12.

Interest in low-temperature carbonization continued high, but no commercial full-scale plants were constructed during the year. The increasing use of coal for power generation, the depletion of coking-coal reserves, and the possibility of using the high tar yields as a future source of chemical raw materials were the principal factors in creating interest in the United States in low-temperature carbonization.

Among the newer low-temperature carbonization processes under development in the United States were: The commercial lignite plant of Texas Power and Light Co., at Rockdale, Tex., (based in part on developments by the Federal Bureau of Mines), the Singh 3-vessel process under study at Chicago, the process of the Southern Research Institute, sponsored by the Alabama Power Co., the 2-ton-per-day pilot plant of Pittsburgh Consolidation Coal Co., the pilot plant of United Engineers and Constructors at Philadelphia, and the 1-vessel fluidization process being studied at Stanford Research Institute.

The Bureau of Mines continued its pilot and laboratory investigations of low-temperature carbonization at Denver, Colo., Grand Forks, N. Dak., and Morgantown, W. Va. Attention at the latter two stations was directed chiefly to research on identifying and characterizing low-temperature-tar constituents. Two Bureau of Mines publications gave assay data on carbonization of American coals at low temperature and assays of low-rank coals at low, medium, and high temperatures.

A meeting of particular interest to the coke industry was the Gordon Research Conference on coal held at New Hampton School, New Hampton, N. H., June 24–28, 1957. The subjects of this conference were coal carbonization and the nature and structure of coke. Like all Gordon Conferences, the discussions were informal and were not published. There were 23 speakers, of whom 12 were from the United States, 6 from Great Britain, 2 from West Germany, 2 from France, and 1 from Canada. Discussions at the conference revealed that research on coal apparently was more intensive and advanced in Europe than in the United States.

The British Coke Research Association (74 Grosvenor Street, London, England) published two pamphlets on carbonization and other subjects of interest to the coke industry. These publications contained extensive bibliographies and were issued in July and December 1957. Industrial and Engineering Chemistry magazine published an excellent summary of coal and shale pyrolysis throughout the world in its September 1957 issue. This 10th annual review covered the period between May 1956 and May 1957 and included studies and investigations on the following: (1) Mechanism, kinetics, and thermochemistry, (2) low- and high-temperature carbonization, and (3) oven operations, products, and byproducts.

WORLD REVIEW [4]

Coke production increased generally throughout the world in 1957. Estimated world production in 1957 was 346 million net tons (excluding breeze) and consisted of 85 percent oven and beehive (metallurgical) coke and 15 percent gashouse and low- and medium-temperature coke.

The United States continued to lead in coke production in 1957, with 22 percent of the total coke and 26 percent of the metallurgical coke produced in the world. Output increased 2 percent over 1956 but was 4 percent less than in 1953 because of the declining demand for coke in residential heating and gas manufacture. Virtually all coke produced in the United States in 1957 was metallurgical coke.

West Germany and U. S. S. R. ranked second and third, respectively, as coke producers and reported 17 and 15 percent, respectively, of the world total output. Although West Germany produced more coke of all kinds than U. S. S. R., the Soviet Union produced more metallurgical coke as 12 percent of West Germany's output was gashouse and low-temperature lignite coke. Production in U. S. S. R. has gained steadily during the past decade and since 1953 has increased at an average rate of 8 percent per year or 32 percent during the past 4-year period. This increase in tonnage was the largest in the world and was attributed to the reported expansion of heavy industry in the Soviet Union. Other leading coke-producing countries were the United Kingdom, France, and Poland. These three countries contributed about one-sixth of the total production and ranked fourth, fifth, and sixth, respectively, in world production.

Significant increases in production have occurred in France, Poland, and Japan during the 4 years shown in tables 42 and 43. Although production of gashouse and low- and medium-temperature coke has remained about constant, metallurgical-coke production has increased 41 percent in France, 38 percent in Poland, and 31 percent in Japan since 1953.

Twenty-six countries in Europe produced 64 percent of the world total of oven and beehive coke and 85 percent of gashouse and other types. Although 54 countries in 6 continental areas produced coke, Europe and the Western Hemisphere produced 91 percent of the total output. Eleven Asiatic countries produced 7 percent of the world total; nearly three-fourths came from China and Japan. The remaining 2 percent was produced chiefly in the Union of South Africa and in Australia.

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[4] Figures on world production compiled by Pearl J. Thompson, Division of Foreign Activities, Bureau of Mines.

TABLE 42.—World production of oven and beehive coke (excluding breeze), 1953–57, by countries, in thousand net tons [1]

Country	1953	1954	1955	1956	1957
North America:					
Canada	3,809	3,082	3,714	4,006	3,803
Mexico	429	440	498	633	755
United States	78,837	59,662	75,302	74,483	75,951
Total	83,075	63,184	79,514	79,122	80,509
South America:					
Brazil	366	504	530	525	[2] 525
Chile	268	292	260	331	[2] 358
Colombia	[2] 22	[2] 22	275	275	192
Peru	26	26	[2] 30	26	25
Total	682	844	1,095	1,157	1,100
Europe:					
Austria	1,342	1,490	1,598	1,896	2,032
Belgium	6,553	6,776	7,275	8,014	7,888
Bulgaria	11	8	11	[2] 11	[2] 11
Czechoslovakia	7,165	7,496	7,716	8,047	[2] 8,270
France	9,830	10,526	12,194	13,502	13,849
Germany:					
East [3]	259	467	505	807	[2] 804
West [4]	41,641	38,494	44,666	47,879	50,367
Hungary	411	442	464	[2] 470	[2] 475
Italy	2,689	2,889	3,251	3,759	4,064
Netherlands	3,532	3,699	4,300	4,688	5,039
Poland [5]	8,710	9,393	11,063	11,574	12,012
Rumania	291	344	342	282	480
Saar	3,956	4,041	4,342	4,636	4,766
Spain	1,301	1,362	1,601	1,818	2,058
Sweden	111	123	137	146	[2] 130
U. S. S. R.	40,700	44,400	48,100	51,400	53,600
United Kingdom	19,579	19,996	20,276	21,881	22,884
Yugoslavia	326	445	806	1,017	1,143
Total	148,407	152,391	168,647	181,827	189,872
Asia:					
China	[2] 3,900	[2] 4,400	[2] 5,000	[2] 6,100	[6] 7,400
India	2,252	2,643	2,908	2,794	[2] 2,870
Iran [7]	3	7	8	10	[2] 10
Japan	5,258	4,840	5,198	5,997	6,910
Korea:					
North [2]	350	400	440	440	440
Republic of	1	[8] 1	(9)	(9)	(9)
Taiwan	165	136	146	128	162
Turkey	605	561	603	554	586
Total	12,500	13,000	14,300	16,000	18,400
Africa:					
Rhodesia and Nyasaland, Federation of: Southern Rhodesia	150	160	209	239	257
Union of South Africa	1,593	1,526	1,544	1,626	1,703
Total	1,743	1,686	1,753	1,865	1,960
Oceania:					
Australia	2,277	2,295	2,240	2,500	2,549
New Caledonia [2]	77	77	80	78	78
New Zealand	7	7	7	7	7
Total	2,361	2,379	2,327	2,585	2,634
World total [2] [10]	248,768	233,484	267,636	282,556	294,475

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[1] Includes revisions of data published previously. Data do not add to totals shown, owing to rounding.
[2] Estimated.
[3] "High-temperature coke" from lignite.
[4] Includes electrode coke.
[5] Includes gashouse and low-temperature coke.
[6] Target.
[7] Year ended March 20 of year following that stated.
[8] Includes gashouse coke.
[9] Negligible.
[10] Revised figures.

TABLE 43.—World production of gashouse, low-, and medium-temperature coke (excluding breeze), 1953–57, by countries, in thousand net tons [1]

Country [2]	1953	1954	1955	1956	1957
North America:					
Canada	158	158	(3)	60	(3)
United States, retort, low- and medium-temperature	237	256	(3)	182	(3)
Total [4]	500	525	310	355	280
South America:					
Argentina [4]	55	55	55	60	55
Chile	121	118	119	117	[4] 123
Peru, medium-temperature	6	7	4	-----	-----
Uruguay	40	39	34	33	32
Total	222	219	212	210	210
Europe:					
Austria	451	504	478	497	367
Belgium	22	20	10	4	4
Czechoslovakia: [4]					
Gashouse	810	815	840	855	855
Lignite	1,765	1,875	1,970	2,000	2,040
Denmark	414	459	445	435	422
Finland	131	117	96	107	118
France:					
Gashouse [5]	2,702	2,363	1,908	1,761	1,669
Low-temperature	295	315	344	338	311
Germany:					
East:					
Gashouse	2,565	2,845	2,982	3,081	[4] 3,100
Lignite	6,811	6,878	7,020	7,075	[4] 7,110
West:					
Gashouse	4,443	4,725	5,581	6,336	6,019
Lignite	798	764	685	645	643
Greece	34	[4] 34	[4] 34	[4] 33	[4] 33
Hungary	71	69	68	[4] 65	[4] 70
Ireland (Eire)	195	214	212	213	205
Italy	1,187	1,160	1,095	1,103	1,014
Luxembourg	34	36	40	40	40
Netherlands	908	947	958	859	725
Norway [6]	71	68	64	[4] 65	[4] 65
Poland:					
Gashouse	[4] 990	[4] 1,020	[4] 1,050	[4] 1,070	1,065
Low-temperature [4]	105	110	110	110	110
Portugal	37	39	42	41	37
Saar, low-temperature	91	100	128	140	139
Spain	250	270	276	289	279
Sweden	680	751	771	801	736
Switzerland	330	330	330	385	[4] 385
United Kingdom:					
Great Britain	13,781	13,811	14,269	14,186	13,472
Northern Ireland	191	193	183	179	129
Yugoslavia	28	26	26	25	28
Total [4]	42,400	43,100	44,250	45,250	43,750
Asia:					
Ceylon [4]	17	13	13	13	13
Hong Kong	21	22	21	19	21
India:					
Gashouse	110	101	103	79	[4] 85
Low-temperature	1,857	1,735	1,846	2,069	[4] 2,132
Japan:					
Gashouse	2,361	2,429	2,616	2,961	3,328
Low-temperature	[4] 130	[4] 85	76	[4] 75	[4] 75
Korea, Republic of	1	1	1	-----	-----
Malaya [4]	17	19	19	19	19
Taiwan:					
Gashouse	4	6	13	13	[4] 17
Low-temperature	49	44	46	51	[4] 65
Turkey, gashouse	69	122	181	114	[4] 114
Total [4]	4,800	4,740	5,100	5,580	6,030

See footnotes at end of table.

TABLE 43.—World production of gashouse, low-, and medium-temperature coke (excluding breeze), 1953–57, by countries, in thousand net tons [1]—Continued

Country [2]	1953	1954	1955	1956	1957
Africa:					
Algeria	100	104	93	96	[4] 95
Egypt	23	24	25	[4] 25	[4] 27
Tunisia	17	12	1	[4] 1	[4] 1
Union of South Africa	104	99	88	94	97
Total	244	239	207	216	220
Oceania:					
Australia [7]	1,199	940	1,232	1,121	[4] 1,075
New Zealand	[4] 65	84	78	[4] 80	80
Total	1,264	1,024	1,310	1,201	1,155
World total [4]	49,430	49,847	51,389	52,812	51,645

[1] Gashouse coke unless otherwise specified. Includes revisions of data published previously. Data do not add to totals shown, owing to rounding.

[2] Production data for China, Mexico, Rumania, and U. S. S. R. are not available; estimates included in total.

[3] Concealed to avoid disclosing individual country figures; production included in total.

[4] Estimated.

[5] Data reported previously represented commercially disposable production.

[6] Includes breeze.

[7] Year ended June 30 of year stated.

COAL-CHEMICAL MATERIALS

GENERAL SUMMARY

Coal-chemical materials recovered (ammonia, tar, crude light oil, and gas) from the high-temperature carbonization of coal in 1957 had a combined value equivalent to 22 percent of the value of all products. Slot-type ovens seldom are constructed exclusively for producing these materials; yields are too low to justify construction costs. Coke-producing companies reduce the costs of converting coal to coke, the main product, by selling the coal-chemical materials, which have many and varied uses. In recent years increasing the revenue from these materials has been emphasized because of the steadily rising carbonization costs. This new concept in the coke industry is indicated by the recent developments in the use of coke-oven gas as a raw material for chemical synthesis. In Europe, coke-oven gas has been so used for many years but has not been employed in this country. The first United States plant designed to use coke-oven gas was constructed at Ketona, Ala., and went into production in 1956.[5]

A second slightly larger plant at Geneva, Utah, began producing anhydrous ammonia from coke-oven gas in 1957.[6] Much interest centered on these two pioneer plants because, should they prove that anhydrous ammonia can be produced competitively from coke-oven gas, more coke-producing companies, particularly those with large coke plants, will process their coke-oven gas.

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[5] Chemical Engineering, New Hydrogen Source for Ammonia: Vol. 63, No. 6, June 1956, pp. 400–403.

[6] Chemical Week, Vol. 80, No. 27, July 6, 1957, page 71.

The increased emphasis on processing crude light oil and tar at coke plants is reflected in table 46. These data show that in 1957 crude tar and its derivatives had gained 3.2 points over the base period (1947–49), and the value of these products sold and used was equivalent to 13 percent of the cost of the coal. The percentage of coal costs derived from the sale of light oil and its derivatives rose from 6 to 8 percent during the same period.

Although the percentage of coal costs recovered by light oil and tar derivatives increased, the values credited to ammonia and its compounds and coke-oven gas declined. Coke-oven gas decreased 0.8 point, because sales of coke-oven gas for residential heating (which always returns a higher unit value than gas used by producers) dropped. In 1950, for example, 25 percent of all surplus gas was used and/or sold by producing companies for residential heating, compared with only 7 percent in 1957. Although the percentage of coal costs recovered through gas was 0.8 point lower than during the base period (1947–49), it ranked ahead of tar and represented 16 percent of the value of the coal. In recent years ammonia and its compounds declined for the largest loss as a revenue producer in the coke industry. This group of products had been the leading revenue producer but has declined steadily since 1919. Introduction of synthetic-ammonia processes in the 1920's lowered ammonia prices, and returns to coke-oven operators dropped steadily. The abnormal demand for ammonium sulfate from abroad, following World War II, caused an increase in sulfate prices, which in turn slightly raised the percentage of value recovered by ammonia products to 5 percent of the value of coal during 1947–49. Unfavorable market conditions and overproduction of ammonium sulfate (from all sources) forced coke producers to cut their prices drastically in 1957. As a result revenue from sales of sulfate dropped and ammonia products furnished only 3 percent of the cost of the coal.

Notwithstanding the increased emphasis and higher prices of some of the coal chemicals sold, the proportion of total value credited to coal-chemical materials declined in the past decade. In the base period 1947–49, the total value of coal-chemical materials ($2.85) was 25 percent of the value of all products, compared with 23 percent in 1957. In this period the value of coal-chemical materials per ton of coal carbonized increased $1.01 (35 percent). The value of coke and breeze per ton of coal rose $4.49 (52 percent); coal costs to oven-coke-plant operators increased $2.12 (27 percent). These data show that the value of coal-chemical materials has not increased as much as coke but was more than coal costs.

The total value of all coal-chemical materials sold totaled $357,772,272, the highest figure ever reported.

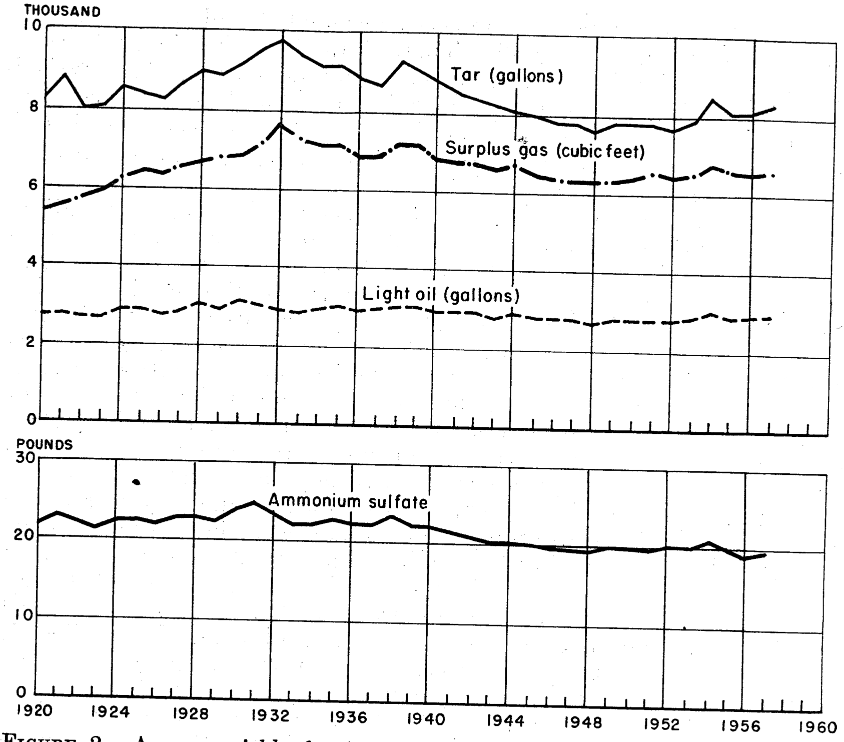

FIGURE 2.—Average yield of principal coal-chemical materials per net ton of coal carbonized in coke ovens, 1920–57. Yields of light oil and ammonium sulfate equivalent represent the average for plants recovering these products.

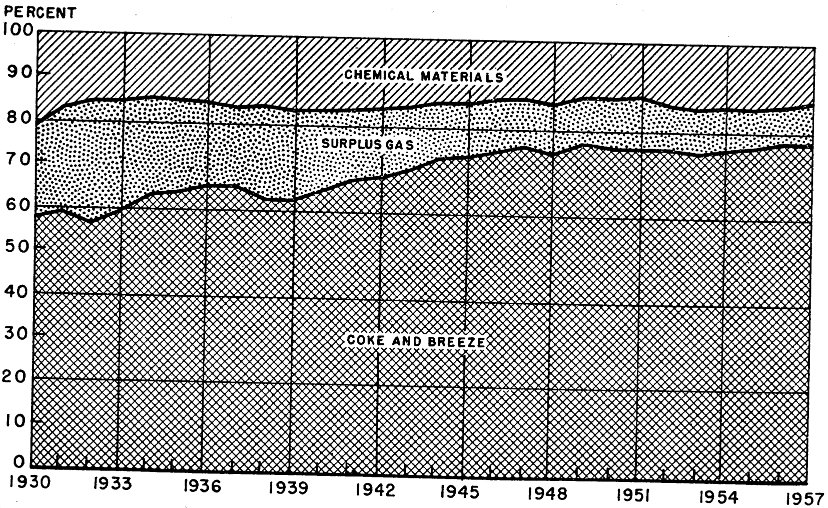

FIGURE 3.—Percentage of total value of coke-oven products from slot-type ovens supplied by coke and breeze, surplus gas, and chemical materials, 1930–57.

TABLE 44.—Coal-chemical materials, exclusive of breeze, produced at coke-oven installations in the United States in 1957[1]

Product	Produced	Sold			On hand Dec. 31
		Quantity	Value		
			Total	Average	
Tar, crude ... gallons	873,474,352	[2] 441,988,878	$57,508,917	$0.130	33,194,747
Tar derivatives:					
Crude chemical oil ... do	26,216,578	27,238,381	7,229,268	.265	733,395
Pitch of tar:[3]					
Soft ... net tons	599,958	14,578	390,430	26.782	12,843
Medium ... do	9,092	9,371	382,385	40.805	702
Hard ... do	315,954	41,054	1,141,649	27.808	3,806
Other tar derivatives[4]			16,929,774		
Ammonia:					
Sulfate[5] ... pounds	1,817,805,088	1,939,631,882	24,843,523	.013	245,230,715
Liquor (NH_3 content) ... do	34,682,620	31,645,981	1,058,336	.033	3,215,656
Diammonium phosphate ... do	75,111,009	79,457,960	4,365,620	.055	8,483,840
Total			30,267,479		
Sulfate equivalent of all forms ... pounds	2,027,449,979	2,141,844,605			
NH_3 equivalent of all forms ... do	522,673,364	552,164,115			
Gas:					
Used under boilers, etc ... M cubic feet	[6] 1,090,845,870	70,672,947	12,912,269	.183	
Used in steel or allied plants ... do		528,492,057	122,200,566	.231	
Distributed through city mains ... do		50,947,967	22,537,537	.442	
Sold for industrial use ... do		37,246,668	7,107,254	.191	
Total	1,090,845,870	687,359,639	164,757,626	.240	
Crude light oil ... gallons	[7] 301,088,346	14,556,561	3,083,271	.212	3,972,983
Light-oil derivatives:					
Benzene:					
Specification grades (all grades except motor) ... gallons	179,252,295	171,944,225	59,080,169	.344	12,906,702
Motor grade ... do	1,834,263	1,768,025	281,500	.159	103,961
Toluene (all grades) ... do	37,985,093	37,095,191	10,226,112	.276	4,371,101
Xylene (all grades) ... do	10,793,389	10,358,165	3,204,248	.309	948,064
Solvent naphtha (crude and refined) gallons	6,278,251	6,260,240	1,624,598	.260	307,395
Other light-oil products ... do	8,115,066	4,472,479	806,373	.180	284,708
Total	244,258,357	231,898,325	75,223,000	.324	18,921,931
Intermediate light oil ... gallons	1,267,369	1,380,425	253,346	.184	73,267
Sodium phenolate ... do	3,947,894	3,983,524	547,515	.137	271,248
Sulfur ... pounds	5,087,220	4,334,820	57,612	.013	1,553,990
Value of all coal-chemical materials sold			357,772,272		

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[1] Includes products of tar distillation conducted by coke-oven operators under same corporate name.

[2] Includes 37,164,819 gallons sold to affiliated companies for refining.

[3] Soft—water-softening point less than 110° F.; medium—from 110° to 160° F.; hard—over 160° F.

[4] Creosote oil, cresols, cresylic acid, crude light tar, naphthalene, phenol, pyridine, red oil, road tar, tar paint, and topped tar.

[5] Includes ammonium thiocyanate.

[6] Includes gas used for heating ovens and gas wasted.

[7] 289,437,715 gallons refined by coke-oven operators to make derived products shown.

TABLE 45.—Average value of coal-chemical materials used and sold and of coke and breeze produced per ton of coal carbonized in the United States, 1947–49 (average) and 1953–57

Product	1947–49 (average)	1953	1954	1955	1956	1957
Ammonia and its compounds	$0.356	$0.375	$0.422	$0.352	$0.315	$0.288
Light oil and its derivatives	[1] .451	[2] .835	[2] .825	[2] .754	[2] .773	.749
Surplus gas sold or used	1.291	1.408	1.519	1.489	1.481	1.570
Tar and its derivatives (including naphthalene):						
Sold	.501	[2] .657	[2] .678	[2] .717	[2] .764	.792
Tar burned by producers [3]	.228	.278	.372	.382	.408	.447
Other products	.020	.027	.009	.010	.008	.010
Total	2.847	3.580	3.825	3.704	3.749	3.856
Coke produced	8.488	10.296	11.115	11.439	12.462	12.885
Breeze produced	.191	.216	.236	.237	.256	.283
Grand total	11.526	14.092	15.176	15.380	16.467	17.024

[1] Includes naphthalene.

[2] Revised figure. Naphthalene changed from light oil to tar.

[3] Includes pitch-of-tar.

TABLE 46.—Percentage of value of coal recovered by coal-chemical materials in the United States, 1947–49 (average) and 1953–57

	1947–49 (average)	1953	1954	1955	1956	1957
Product:						
Ammonia and its compounds	4.6	4.1	4.7	4.0	3.4	2.9
Light oil and its derivatives	[1] 5.8	[2] 9.1	[2] 9.2	[2] 8.6	[2] 8.3	7.6
Surplus gas sold or used	16.6	15.2	16.9	16.8	15.8	15.8
Tar and its derivatives sold or used (including naphthalene)	9.3	[2] 10.1	[2] 11.6	[2] 12.4	[2] 12.5	12.5
Other products	.2	.3	.1	.1	.1	.1
Total	36.5	38.8	42.5	41.9	40.1	38.9
Value of coal per net ton	$7.79	$9.24	$9.00	$8.84	$9.35	$9.91

[1] Includes naphthalene.

[2] Revised figure. Naphthalene changed from light oil to tar.

TABLE 47.—Coal equivalent of the thermal materials, except coke, produced at oven-coke plants in the United States, 1913, 1918, 1929, 1939, 1947–49 (average), and 1953–57

Year	Materials produced				Estimated equivalent in heating value [1] (billion B. t. u.)					Coal equivalent (thousand net tons)
	Coke breeze (thousand net tons)	Surplus gas (billion cubic feet)	Tar (thousand gallons)	Light oil (thousand gallons)	Coke breeze	Surplus gas	Tar	Light oil	Total	
1913	735	64	115,145	3,000	14,700	35,200	17,272	390	67,562	2,600
1918	1,999	158	263,299	87,562	39,980	86,900	39,495	11,383	177,758	6,785
1929	4,853	508	680,864	200,594	97,060	279,400	102,130	26,077	504,667	19,262
1939	3,354	434	554,406	170,963	67,080	238,700	83,161	22,225	411,166	15,693
1947–49 (average)	5,390	582	715,779	246,607	107,800	320,100	107,367	32,059	567,326	21,654
1953	5,253	673	828,729	295,725	105,060	370,150	124,309	38,444	637,963	24,350
1954	3,931	558	715,840	246,019	78,620	306,900	107,376	31,982	524,878	20,034
1955	4,862	689	852,923	297,498	97,240	378,950	127,938	38,675	642,803	24,534
1956	4,772	664	832,827	290,972	95,436	365,200	124,924	37,826	623,386	23,793
1957	4,863	687	873,474	301,088	97,252	377,850	131,021	39,141	645,264	24,628

[1] Breeze, 10,000 B. t. u. per pound; gas, 550 B. t. u. per cubic foot; tar, 150,000 B. t. u. per gallon; and light oil, 130,000 B. t. u. per gallon.

COKE-OVEN GAS

Modern high-temperature slot-type coke ovens are primarily producers of specialized forms of fuel. In addition to the main product—coke—they produce another major fuel—gas. In 1957 approximately 17 percent by weight of the coal charged into the ovens was recovered in the form of fuel gas. The yield of gas per ton of coal (10.40 thousand cubic feet) was the highest since 1944 but considerably below the 11.25 thousand cubic feet maximum of 1932. Total production reached a new peak, however, exceeding the previous record of 1955 by 7,221,275 thousand cubic feet, and was 35,517,188 thousand cubic feet (3 percent) above the 1956 total. Thirty-five percent of the total production was used to heat the ovens, 63 percent sold or used (surplus), and 2 percent wasted. As noted in table 48, most gas was wasted at furnace plants and was attributed to a lack of storage capacity (gas holders). On weekends, when integrated steel mills operated on one shift, all surplus gas available to the heating and melting furnaces could not be used and was flared into the air. The percentage wasted was small and does not justify the expenditure for gas holders at furnace plants.

Several significant developments have occurred in utilization of coke-oven gas in the past 20 years. The use of blast-furnace gas in underfiring coke ovens increased. In 1940 blast-furnace gas represented only 5 percent of all gas used for underfiring. In 1957, however, blast-furnace gas had risen to 16 percent. Most of the batteries

TABLE 48.—Production and disposal of coke-oven gas in the United States in 1957, by States, in thousand cubic feet

State	Produced		Used in heating ovens	Surplus sold or used			Wasted
					Value		
	Total	Per ton of coal coked		Quantity	Total	Average	
Alabama	81, 981, 952	10. 09	38, 878. 200	41, 243, 476	$5, 451, 613	$0. 132	1, 860, 276
California, Colorado, and Utah	58, 464, 422	11. 36	14, 975, 528	41, 999, 907	9, 924, 696	. 236	1, 488, 987
Illinois	41, 186, 419	10. 08	12, 577, 408	24, 670, 737	5, 432, 890	. 220	3, 938, 274
Indiana	136, 815, 224	10. 21	47, 001, 373	88, 629, 256	20, 513, 220	. 231	1, 184, 595
Kentucky, Tennessee, and Texas	27, 715, 199	9. 57	11, 648, 509	13, 235, 361	1, 722, 237	. 130	2, 831, 329
Maryland	53, 047, 890	11. 15	12, 488, 634	39, 827, 076	(1)	(1)	732, 180
Massachusetts	8, 165, 220	10. 01	1, 438, 247	6, 726, 973	(1)	(1)	----------
Michigan	50, 201, 426	10. 17	6, 747, 881	40, 973, 512	11, 082, 279	. 270	2, 480, 033
Minnesota	14, 040, 647	10. 97	5, 525, 908	7, 791, 609	2, 159, 920	. 277	723, 130
New Jersey	13, 696, 971	10. 33	2, 685, 249	11, 011, 722	(1)	(1)	----------
New York	60, 750, 597	10. 58	17, 792, 214	42, 389, 088	12, 743, 583	. 301	569, 295
Ohio	162, 298, 320	10. 12	63, 424, 084	93, 504, 870	21, 503, 763	. 230	5, 369, 366
Pennsylvania	303, 938, 235	10. 40	116, 542, 449	183, 489, 095	41, 739, 353	. 227	3, 906, 691
West Virginia	63, 246, 726	11. 14	18, 899, 801	42, 350, 405	8, 143, 201	. 192	1, 996, 520
Connecticut, Missouri, and Wisconsin	15, 296, 622	10. 24	5, 780, 070	9, 516, 552	4, 771, 819	. 501	----------
Undistributed	----------	------	----------	----------	19, 569, 052	. 340	----------
Total 1957	1, 090, 845, 870	10. 40	376, 405, 555	687, 359, 639	164, 757, 626	. 240	27, 080, 676
At merchant plants	118, 716, 244	9. 81	44, 029, 076	73, 323, 907	24, 918, 366	. 340	1, 363, 261
At furnace plants	972, 129, 626	10. 47	332, 376, 479	614, 035, 732	139, 839, 260	. 228	25, 717, 415
Total 1956	1, 055, 328, 682	10. 32	370, 373, 816	663, 595, 640	151, 481, 650	. 228	21, 359, 226

[1] Included with "Undistributed" to avoid disclosing individual company figures.

TABLE 49.—Surplus coke-oven gas used by producers and sold in the United States in 1957, by States, in thousand cubic feet

State	Used by producers—					
	Under boilers			In steel or allied plants		
	Quantity	Value		Quantity	Value	
		Total	Average		Total	Average
Alabama	12,916,190	$1,575,884	$0.122	25,152,059	$3,511,110	$0.140
California, Colorado, and Utah	(1)	(1)	(1)	38,369,358	9,237,479	.241
Illinois	(1)	(1)	(1)	19,564,269	4,545,252	.232
Indiana	(1)	(1)	(1)	66,276,261	14,208,379	.214
Kentucky, Tennessee, and Texas	5,602,328	619,044	.110	462,508	43,828	.095
Maryland	----------	----------	----------	39,827,076	(1)	(1)
Massachusetts	416,571	(1)	(1)	649	(1)	(1)
Michigan	(1)	(1)	(1)	35,780,401	9,635,526	.269
Minnesota	2,199,830	457,931	.208	(1)	(1)	(1)
New Jersey	230,000	(1)	(1)	----------	----------	----------
New York	(1)	(1)	(1)	(1)	(1)	(1)
Ohio	11,147,304	2,418,108	.217	73,229,135	17,514,929	.239
Pennsylvania	14,963,909	2,608,383	.174	159,765,987	34,706,647	.217
West Virginia	3,247,414	305,386	.094	37,341,267	7,669,666	.205
Connecticut, Missouri, and Wisconsin	(1)	(1)	(1)	----------	----------	----------
Undistributed	19,949,401	4,927,533	----------	32,723,087	21,127,750	----------
Total 1957	70,672,947	12,912,269	.183	528,492,057	122,200,566	.231
At merchant plants	14,023,446	2,593,628	.185	6,253,360	1,412,168	.226
At furnace plants	56,649,501	10,318,641	.182	522,238,697	120,788,398	.231
Total 1956	63,372,938	10,325,566	.163	497,279,254	108,006,604	.217

State	Sold					
	Distributed through city mains			For industrial purposes		
	Quantity	Value		Quantity	Value	
		Total	Average		Total	Average
Alabama	(1)	(1)	(1)	(1)	(1)	(1)
California, Colorado, and Utah	----------	----------	----------	(1)	(1)	(1)
Illinois	----------	----------	----------	(1)	(1)	(1)
Indiana	3,312,977	$1,904,366	$0.575	(1)	(1)	(1)
Kentucky, Tennessee, and Texas	----------	----------	----------	7,170,525	$1,059,365	$0.148
Maryland	----------	----------	----------	----------	----------	----------
Massachusetts	6,309,753	(1)	(1)	----------	----------	----------
Michigan	----------	----------	----------	(1)	(1)	(1)
Minnesota	(1)	(1)	(1)	(1)	(1)	(1)
New Jersey	10,781,722	(1)	(1)	----------	----------	----------
New York	(1)	(1)	(1)	(1)	(1)	(1)
Ohio	(1)	(1)	(1)	(1)	(1)	(1)
Pennsylvania	8,759,199	4,424,323	.505	----------	----------	----------
West Virginia	(1)	(1)	(1)	(1)	(1)	(1)
Connecticut, Missouri, and Wisconsin	(1)	(1)	(1)	(1)	(1)	(1)
Undistributed	21,784,316	16,208,848	----------	30,076,143	6,047,889	.201
Total 1957	50,947,967	22,537,537	.442	37,246,668	7,107,254	.191
At merchant plants	34,554,497	17,790,527	.515	18,492,604	3,122,043	.169
At furnace plants	16,393,470	4,747,010	.290	18,754,064	3,985,211	.212
Total 1956	64,302,983	26,284,050	.409	38,640,465	6,865,430	.178

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[1] Included with "Undistributed" to avoid disclosing individual company figures.

recently constructed for steel companies are designed to use various gases, including natural, coke-oven, and blast-furnace. By underfiring the coke ovens with blast-furnace gas (90 B. t. u. per cubic foot) companies can use their coke-oven gas advantageously in integrated metallurgical furnaces. In 1957 furnace plants used 94 percent of their surplus gas under boilers and in steel and allied plants and sold the remaining 6 percent for residential heating and for industrial purposes.

The most significant trend, however, was the declining use of coke-oven gas for commercial and residential heating and cooking (distributed through city mains). According to the American Gas Association, the distribution of coke-oven gas through city mains reached a peak in 1947. In that year coke ovens supplied 996 million therms (35 percent) of the 2, 874.1 million therms of manufactured gas distributed by utilities. Substitution of natural gas for coke-oven gas by utility companies in virtually all sections of the United States since 1947 and particularly after 1950 drastically curtailed demand for coke-oven gas. In 1956, the latest year for which the American Gas Association's figures are available, only 1,433.5 million therms of manufactured gas (including 348.8 million therms of coke-oven gas) was distributed by gas utilities. From data shown in table 49 it was obvious that the distribution of coke-oven gas for commercial and residential heating and cooking was much lower in 1957 than in 1956. The quantity of coke-oven gas distributed through city mains in 1957 was 21 percent below 1956 and only about one-third as much as in 1950. Detailed statistics on the disposal of surplus gas by merchant and furnace plants are shown in table 49.

TABLE 50.—Coke-oven gas and other gases used in heating coke ovens in the United States in 1957, by States, in thousand cubic feet [1]

State	Coke-oven gas	Producer gas	Blue-water gas	Blast-furnace gas	Natural gas	Other gases [2]	Total coke-oven gas equivalent
Alabama	38, 878, 200	--------	--------	--------	--------	--------	38, 878, 200
California, Colorado, and Utah	14, 975, 528	--------	--------	10, 285, 132	--------	--------	25, 260, 660
Illinois	12, 577, 408	--------	--------	5, 643, 612	--------	--------	18, 221, 020
Indiana	47, 001, 373	--------	--------	15, 008, 821	1, 237, 802	2, 747	63, 250, 743
Kentucky, Tennessee, and Texas	11, 648, 509	--------	--------	--------	--------	--------	11, 648, 509
Maryland	12, 488, 634	--------	--------	8, 123, 890	--------	--------	20, 612, 524
Massachusetts	1, 438, 247	--------	--------	--------	1, 044, 049	--------	2, 482, 296
Michigan	6, 747, 881	--------	--------	13, 414, 003	124, 578	--------	20, 286, 462
Minnestoa	5, 525, 908	137, 053	830, 245	--------	--------	9, 718	6, 502, 924
New Jersey	2, 685, 249	1, 300, 000	--------	--------	1, 646, 321	--------	5, 631, 570
New York	17, 792, 214	--------	--------	8, 329, 022	298, 307	--------	26, 419, 543
Ohio	63, 424, 084	--------	--------	6, 010, 281	--------	--------	69, 434, 365
Pennsylvania	116, 542, 449	998, 705	40, 553	3, 098, 794	--------	327	120, 680, 828
West Virginia	18, 899, 801	--------	--------	5, 417, 655	--------	1, 654, 904	25, 972, 360
Connecticut, Missouri, and Wisconsin	5, 780, 070	1, 024, 068	--------	--------	802, 000	1, 115	7, 607, 253
Total 1957	376, 405, 555	3, 459, 826	870, 798	75, 331, 210	5, 153, 057	1, 668, 811	462, 889, 257
At merchant plants	44, 029, 076	3, 459, 826	--------	--------	3, 874, 678	1, 656, 346	53, 019, 926
At furnace plants	332, 376, 479	--------	870, 798	75, 331, 210	1, 278, 379	12, 465	409, 869, 331
Total 1956	370, 373, 816	5, 675, 366	--------	70, 558, 370	4, 969, 767	1, 716, 728	453, 294, 047

[1] Adjusted to an equivalent of 550 B. t. u. per cubic foot.
[2] Liquified-petroleum, propane, and spillage gases.

CRUDE COAL TAR AND DERIVATIVES

In 1957 high-temperature slot-type coke ovens supplied all but an insignificant quantity of the coal tar produced in the United States. A new record in tar production was established in 1957, and the average yield increased 0.17 gallon per ton of coal carbonized over 1956. The relative yields of tar have not changed greatly in the past several decades (see fig. 2) although the average annual recovery has varied

TABLE 51.—Coke-oven tar produced, used by producers, and sold in the United States in 1957, by States, in gallons

State	Produced		Used by producers—		
	Total	Per ton of coal coked	For refining or topping [1]	As fuel	Otherwise
Alabama	62, 758, 148	7. 73	13, 580, 407	8, 221, 343	109, 434
California, Colorado, and Utah	50, 681, 705	9. 85	9, 709, 637	20, 827, 564	36, 106
Illinois	30, 114, 087	7. 37	1, 979, 500		68, 900
Indiana	84, 578, 811	6. 31	24, 642, 186	18, 106, 139	39, 644
Kentucky, Tennessee, and Texas	20, 307, 043	7. 01			45, 200
Maryland	41, 120, 585	8. 64		35, 032, 395	
Massachusetts	6, 264, 101	7. 68			
Michigan	38, 792, 314	7. 86			450
Minnesota	9, 269, 174	7. 24			6, 384
New Jersey	10, 290, 949	7. 76			
New York	46, 325, 689	8. 07	25, 125, 357		61, 359
Ohio	123, 710, 891	7. 71	1, 376, 455	14, 767, 388	288, 219
Pennsylvania	282, 241, 310	9. 66	161, 087, 399	75, 938, 145	2, 624, 896
West Virginia	57, 431, 039	10. 11	20, 864, 165		
Connecticut, Missouri, and Wisconsin	9, 588, 506	6. 42			
Total 1957	873, 474, 352	8. 32	258, 365, 106	172, 892, 974	3, 280, 592
At merchant plants	87, 104, 258	7. 20	911, 306		
At furnace plants	786, 370, 094	8. 47	257, 453, 800	172, 892, 974	3, 280, 592
Total 1956	832, 827, 042	8. 15	285, 804, 994	138, 425, 042	1, 397, 872

State	Sold for refining into tar products [2]			On hand Dec. 31
	Quantity	Value		
		Total	Average	
Alabama	41, 300, 137	$5, 244, 085	$0. 127	2, 634, 084
California, Colorado, and Utah	20, 596, 967	2, 520, 027	. 122	1, 894, 842
Illinois	28, 614, 586	3, 927, 745	. 137	1, 132, 865
Indiana	42, 418, 751	5, 821, 197	. 137	3, 888, 459
Kentucky, Tennessee, and Texas	20, 299, 985	2, 649, 825	. 131	422, 284
Maryland	6, 113, 564	(3)	(3)	2, 291, 691
Massachusetts	6, 272, 281	(3)	(3)	180, 772
Michigan	39, 005, 555	5, 146, 432	. 132	1, 773, 943
Minnesota	9, 694, 731	1, 218, 873	. 126	298, 705
New Jersey	10, 233, 633	(3)	(3)	724, 837
New York	20, 103, 710	(3)	(3)	2, 471, 577
Ohio	107, 518, 788	13, 453, 593	. 125	4, 787, 467
Pennsylvania	43, 381, 750	5, 519, 026	. 127	8, 935, 726
West Virginia	37, 054, 200	5, 307, 162	. 143	856, 322
Connecticut, Missouri, and Wisconsin	9, 380, 240	1, 215, 701	. 130	901, 173
Undistributed		5, 485, 251	. 128	
Total 1957	441, 988, 878	57, 508, 917	. 130	33, 194, 747
At merchant plants	86, 257, 194	11, 155, 349	. 129	3, 347, 277
At furnace plants	355, 731, 684	46, 353, 568	. 130	29, 847, 470
Total 1956	416, 286, 387	50, 128, 897	. 120	33, 012, 294

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[1] Includes 3,193,651 gallons also shown under "Sold for refining into tar products".

[2] Comprises 37,164,819 gallons valued at $4,832,072 sold to affiliated companies and 404,824,059 gallons valued at $52,676,845 sold to other purchasers.

[3] Included with "Undistributed" to avoid disclosing individual company figures.

depending on the kinds of coal used, the oven temperature employed, and general business conditions. The most notable change in the use of crude tar has been the decline in its use as fuel. In 1940 approximately 32 percent of crude coke-oven tar was burned, 23 percent was processed (distilled or topped) by the coke-oven operators, and 46 percent was sold to tar distillers for refining. The tremendous increase in requirements of naphthalene, phenol, and other tar products in recent years caused several coke-producing companies to install tar-refining facilities. By processing tar, coke producers could market the distillates (naphthalene, phenol, and creosote oil) and burn the residual tar or pitch in integrated metallurgical furnaces. By 1956, the quantity of crude tar burned dropped to 17 percent of production; coke producers processed 34 percent in integrated facilities; the remainder was sold to commercial tar refineries. The quantity of tar processed by coke-oven operators decreased 10 percent in 1957, however, because two of the coke-producing companies sold their tar-refining facilities to a commercial tar-distilling company, and also because of a slump in demand for naphthalene. This decrease in processed tar caused the quantity of tar burned to reach the highest figure since 1940. Disposal changed slightly from 1956, in that the proportion of tar burned rose to 20 percent of output; producers processed 30 percent and sold the remainder, 51 percent, to tar distillers. Some crude tar was burned at plants that operated tar-processing facilities. At these plants the tar was collected in separate storage tanks. The "heavy" tars, which contain low percentages of the more valuable tar products (naphthalene, phenol, and other tar acids), were blended with soft pitch and the resultant pitch-tar burned. The "light" tars, which yield a high percentage of soluble products, were distilled.

The principal tar derivatives are creosote oil, tar-acid oil (crude chemical oil), naphthalene, and pitch. The Bureau of Mines discontinued publishing coke-oven statistics on creosote oil, naphthalene, and phenol to avoid disclosing individual company figures because the ownership of the two tar-processing plants changed (foregoing paragraph). The only tar derivatives on which statistics can be shown are crude chemical oil and pitch. Production of crude chemical oil varied only slightly from 1956, but commercial sales increased about 1 million gallons. Both production and sales of pitch decreased in 1957.

COKE-OVEN AMMONIA

Production of coke-oven ammonia (NH_3 equivalent of all forms) was the highest on record but was only 7 percent of the United States production from all sources. Synthetic processes, first introduced in the United States in the early 1920's, supplied most of the ammonia used in industry and agriculture in 1957. Ammonia products are essential for making fertilizers and explosives and have many important applications in the chemical industry. Ammonia at coke plants is recovered in two forms: (1) An aqueous solution known as ammonia liquor and (2) a crystalline solid such as ammonium sulfate and diammonium phosphate. Virtually all ammonium sulfate and diammonium phosphate was used as a fertilizer in agriculture. Ammonia liquor was used for industrial purposes and in agriculture; quantities

TABLE 52.—Coke-oven ammonia produced and sold in the United States in 1957, by States, in pounds

State	Active plants[1]	Produced			
		Sulfate equivalent	Per ton of coal coked	As sulfate[2]	As liquor (NH_3 content)
Alabama	7	180,926,102	22.28	173,800,449	(3)
California, Colorado, and Utah[4]	4	111,954,892	21.75	111,954,892	----------
Illinois	6	74,905,944	18.76	[5] 90,103,982	----------
Indiana	5	210,026,912	15.67	[5] 185,643,584	(3)
Kentucky, Tennessee, and Texas	4	56,422,237	19.49	26,912,291	(3)
Maryland	1	95,471,529	20.06	95,471,529	----------
Massachusetts[6]	1	14,044,705	17.22	14,044,705	----------
Michigan[7]	4	90,795,382	18.39	73,678,934	(3)
Minnesota	3	17,759,747	16.59	17,759,747	----------
New Jersey	2	(3)	(3)	(3)	----------
New York	3	131,485,433	22.90	111,878,000	(3)
Ohio	16	293,408,422	18.38	249,554,554	11,305,457
Pennsylvania	14	602,785,337	20.75	602,785,337	----------
West Virginia	4	106,295,036	20.03	106,295,036	----------
Connecticut, Missouri, and Wisconsin	3	(3)	(3)	(3)	(3)
Undistributed	-------	41,168,301	16.75	33,033,057	23,377,163
Total 1957	77	2,027,449,979	19.56	1,892,916,097	34,682,620
At merchant plants	20	210,391,364	19.30	106,110,338	26,883,482
At furnace plants	57	1,817,058,615	19.59	1,786,805,759	7,799,138
Total 1956	78	1,949,604,164	19.28	1,812,436,868	35,361,509

State	Sold				On hand Dec. 31	
	As sulfate[2]		As liquor (NH_3 content)		Sulfate[2]	Liquor (NH^3 content)
	Quantity	Value	Quantity	Value		
Alabama	188,462,914	$2,481,814	(3)	(3)	26,838,950	(3)
California, Colorado, and Utah[4]	112,015,933	4,276,043	----------	----------	44,738,025	----------
Illinois	101,712,436	1,545,643	----------	----------	4,581,756	----------
Indiana	216,776,227	2,574,132	(3)	(3)	28,292,840	(3)
Kentucky, Tennessee, and Texas	26,110,750	399,778	(3)	(3)	3,094,291	(3)
Maryland	106,168,740	(3)	----------	----------	2,454,314	----------
Massachusetts[6]	12,950,965	(3)	----------	----------	2,248,480	----------
Michigan[7]	73,910,760	2,135,031	(3)	(3)	9,309,013	511,636
Minnesota	18,219,060	287,921	----------	----------	2,199,897	----------
New Jersey	24,354,200	(3)	----------	----------	1,506,637	----------
New York	(3)	(3)	(3)	(3)	(3)	(3)
Ohio	262,696,585	3,595,382	10,346,948	$326,978	22,997,357	1,238,493
Pennsylvania	642,426,879	6,875,714	(3)	(3)	87,985,254	----------
West Virginia	105,210,213	1,278,724	----------	----------	10,032,541	----------
Connecticut, Missouri, and Wisconsin	(3)	(3)	(3)	(3)	(3)	(3)
Undistributed	128,074,180	3,758,961	21,299,033	731,358	7,435,200	1,465,527
Total 1957	2,019,089,842	29,209,143	31,645,981	1,058,336	253,714,555	3,215,656
At merchant plants	111,412,510	1,846,418	23,969,131	845,451	8,085,634	2,534,354
At furnace plants	1,907,677,332	27,362,725	7,676,850	212,885	245,628,921	681,302
Total 1956	1,846,643,159	30,997,064	32,587,478	1,205,393	381,873,762	3,014,480

[1] Number of plants that recovered ammonia.
[2] Includes diammonium phosphate and ammonium thiocyanate.
[3] Included with "Undistributed" to avoid disclosing individual company figures.
[4] Figures include diammonium phosphate made in California and Colorado.
[5] Difference between actual production of sulfate and sulfate equivalent owing to transfer of liquor from Indiana for conversion into sulfate in Illinois by same company.
[6] Figures include ammonium thiocyanate.
[7] Figures include diammonium phosphate.

for each purpose were not known as the producing companies were not requested to supply such information. Ninety percent of the total ammonia recovered from coke ovens in 1957 was converted into sulfate; 7 percent, ammonia liquor; and 4 percent, diammonium phosphate.

At the beginning of the year, 77 plants recovered ammonia in one form or another. Of the 77 plants recovering ammonia, 64 made ammonium sulfate; 13, ammonia liquor; 3, diammonium phosphate; and 1, ammonium thiocyanate (1 plant made both sulfate and liquor). Coke-oven operators cut prices of ammonium sulfate in 1957 to the lowest figure in 11 years owing to oversupply, causing 4 plants to discontinue production during the last part of the year.

For the second consecutive year, sales of ammonium sulfate exceeded production, and stocks declined. Despite this fact, stocks at producers' plants at the end of the year were unusually high. Prices in 1957 declined from $32 per ton in 1956 to $26. The price of ammonia liquor (NH_3 content) also dropped.

CRUDE LIGHT OIL AND DERIVATIVES

Crude light oil was recovered at all but 6 oven-coke plants that produced in 1957, and output exceeded 300 million gallons for the first time. Although crude tar contains a small percentage of light oil, only an insignificant quantity was obtained from this source, and virtually all coke-oven light oil was obtained by scrubbing it out of the gas stream. The yield of crude light oil per ton of coal carbonized increased slightly over 1956 but was slightly lower than the 1954 yield. Although improvements have been made in scrubbing equipment installed at coke plants in recent years, yields have varied slightly, indicating that light-oil-recovery methods used in the past were efficient.

Most of the light oil produced at coke plants is refined by the producers in integrated facilities. The yields of light-oil products have not changed to any great extent as indicated in table 54. A 1957 development, which may affect yields in the future, particularly of benzene, is hydrogen refining light oil followed by Udex-solvent extraction system of separating aromatics from nonaromatics. The first installation to use the new hydrogenation-extraction system, a 55,000-gallon-per-day unit, was placed in operation in 1957 by the Jones and Laughlin Steel Corp. at Aliquippa, Pa. A second plant of 150,000-gallon-per-day capacity was under construction at Clairton, Pa., by the United States Steel Corp. These hydrogen-refining processes can produce extremely pure products and will enable the coke industry to meet the most rigid specifications on light-oil derivatives.

In refining light oil approximately 85 percent of the quantity charged into the stills is recovered in the form of salable products. Benzene (benzol) is the major light-oil derivative and is one of the most important chemicals in the synthetic organic chemical industry. Requirements for this chemical in recent years have increased more rapidly than could be supplied from coal carbonization and increasing quantities have been obtained from petroleum (see table 57). Considerable quantities have also been imported, averaging 52.3 million gallons per year for 1955–57. Approximately 85 percent of the benzene imported during these 3 years came from Soviet-Bloc countries (Czechoslovakia, Poland, and U. S. S. R.). Crude benzene imported before 1955 required further processing in the United States.

However, much of the benzene imported in 1955–57 was of specification grades and was not further refined.

The average value per gallon of coke-oven benzene remained the same in 1957 and was $0.02 below the average receipts per gallon obtained by tar distilleries and $0.04 under the price received by petroleum refineries.

TABLE 53.—Coke-oven crude light oil produced in the United States and derived products produced and sold in 1957, by States, in gallons

State	Active plants[1]	Crude light oil				Derived products		
		Produced	Per ton of coal coked	Refined on premises[2]	On hand Dec. 31	Produced	Sold[3]	
							Quantity	Value
Alabama	7	21,477,988	2.64	21,028,781	329,599	17,023,650	16,626,050	$5,670,693
California, Colorado, and Utah	4	17,806,625	3.46	17,832,476	121,538	15,525,362	14,476,759	4,697,267
Illinois	6	11,620,025	2,91	8,528,492	90,650	6,937,657	6,310,575	2,071,115
Indiana	4	32,320,803	2.54	35,124,656	296,640	28,123,788	27,442,176	8,869,576
Kentucky, Tennessee, and Texas	4	8,018,276	2.77	3,636,619	164,067	2,996,355	2,926,130	938,492
Maryland	1	16,251,375	3.41	16,252,894	153,171	14,919,770	14,255,006	(4)
Massachusetts	1	2,083,257	2.55	3,286,688	62,008	2,704,022	2,350,379	(4)
Michigan	4	13,723,625	2.78	7,856,536	442,449	6,536,311	6,235,643	2,025,533
New Jersey	1	2,239,264	2.55	------	38,320	------	------	------
New York	3	18,158,073	3.16	27,266,086	259,720	24,282,897	23,568,753	7,609,347
Ohio	16	45,425,693	2.83	41,373,791	531,622	35,033,737	32,564,443	10,328,396
Pennsylvania	14	91,650,505	3.14	89,721,397	1,187,664	75,170,800	71,484,804	23,281,069
West Virginia	5	17,021,302	3.00	15,497,733	212,108	13,251,136	12,055,346	3,873,352
Connecticut, Missouri, and Wisconsin	3	3,291,535	2.20	2,031,566	83,427	1,752,872	1,602,261	(4)
Undistributed	------	------	------	------	------	------	------	5,858,160
Total 1957	73	301,088,346	2.94	289,437,715	3,972,983	244,258,357	231,898,325	75,223,000
At merchant plants	18	26,258,626	2.46	21,355,003	1,029,477	18,276,122	16,651,455	5,166,971
At furnace plants	55	274,829,720	2.99	268,082,712	2,943,506	225,982,235	215,246,870	70,056,029
Total 1956	74	290,972,209	2.92	276,765,214	6,206,887	234,228,862	229,816,855	75,054,376

[1] Number of plants that recovered crude light oil.

[2] Includes small quantity of material also reported in sales of crude light oil in table 44.

[3] Excludes 14,556,561 gallons of crude light oil valued at $3,083,271 sold as such.

[4] Included with "Undistributed" to avoid disclosing individual company figures.

TABLE 54.—Yield of light-oil products from refining crude light oil at oven-coke plants in the United States, 1929, 1939, 1947–49 (average), and 1953–57, in percent

Year	Benzene		Toluene, crude and refined	Xylene, crude and refined	Solvent naphtha	Other light-oil products
	Motor	All other grades				
1929	54.4	12.8	9.4	(1)	3.7	3.4
1939	48.6	15.4	12.1	2.5	2.9	3.8
1947–49 (average)	6.5	59.2	11.7	3.1	2.3	3.3
1953	.4	63.7	12.9	3.6	2.3	2.2
1954	1.4	59.6	14.3	4.3	2.0	1.7
1955	(2)	62.0	13.6	4.0	2.0	2.3
1956	(2)	63.0	13.5	3.7	2.1	2.3
1957	.6	61.9	13.1	3.7	2.2	2.8

[1] Included with solvent naphtha.

[2] Included with "Other light-oil products" to avoid disclosing individual company figures.

TABLE 55.—Production and sales of light-oil derivatives at coke plants in the United States in 1957, by States, in gallons

State	Benzene (all grades except motor)				Toluene (all grades)			
	Production	Yield from crude light oil refined (percent)	Sales		Production	Yield from crude light oil refined (percent)	Sales	
			Quantity	Value			Quantity	Value
Alabama	13,385,498	63.7	13,108,268	$4,645,211	2,625,329	12.5	2,532,809	$759,977
California, Colorado, and Utah	10,633,417	59.6	10,490,970	3,670,363	2,729,610	15.3	2,602,262	660,980
Illinois	5,461,204	64.0	4,944,538	(1)	1,000,643	11.7	905,033	(1)
Indiana	22,929,389	65.3	22,480,551	7,583,270	3,306,081	9.4	3,244,715	898,120
Maryland	10,603,539	65.2	10,163,059	(1)	2,515,329	15.5	2,321,506	(1)
Massachusetts	2,115,592	64.4	1,741,617	(1)	440,390	13.4	454,081	(1)
Michigan and Wisconsin	5,836,527	63.7	5,519,961	1,893,724	1,320,980	14.4	1,239,989	322,190
New York	17,917,630	65.7	17,300,512	5,943,886	3,548,727	13.0	3,480,077	973,235
Ohio	26,232,184	63.4	25,030,373	8,216,038	4,983,999	12.0	4,906,961	1,396,345
Pennsylvania	51,994,861	58.0	49,993,245	17,506,646	12,481,064	13.9	12,614,345	3,389,130
West Virginia	9,293,132	60.0	8,380,806	2,930,979	2,562,884	16.5	2,337,348	620,920
Missouri, Tennessee, and Texas	2,849,322	65.4	2,790,325	933,401	470,057	10.8	456,065	134,616
Undistributed				5,756,651				1,070,599
Total 1957	179,252,295	61.9	171,944,225	59,080,169	37,985,093	13.1	37,095,191	10,226,112
At merchant plants	12,962,475	60.7	11,661,328	3,897,864	3,046,711	14.3	2,809,825	807,822
At furnace plants	166,289,820	62.0	160,282,897	55,182,305	34,938,382	13.0	34,285,366	9,418,290
Total 1956	174,426,023	63.0	173,420,085	59,547,670	37,238,064	13.5	35,583,636	10,161,869

State	Xylene (all grades)				Solvent naphtha (crude and refined)			
	Production	Yield from crude light oil refined (percent)	Sales		Production	Yield from crude light oil refined (percent)	Sales	
			Quantity	Value			Quantity	Value
Alabama	644,923	3.1	643,221	$205,182	200,010	1.0	174,629	$43,788
California, Colorado, and Utah	638,554	3.6	661,254	175,369	697,165	3.9	671,350	178,843
Illinois	223,407	2.6	193,473	(1)	90,503	1.1	105,631	29,705
Indiana	491,408	1.4	431,950	138,326	1,263,944	3.6	1,275,040	249,463
Maryland	771,236	4.7	750,302	(1)	10,177	.1	10,177	(1)
Massachusetts	87,619	2.7	94,189	(1)	60,421	1.8	60,492	(1)
Michigan and Wisconsin	311,877	3.4	296,111	92,652	(1)		(1)	(1)
New York	848,408	3.1	823,759	326,351	(1)		(1)	(1)
Ohio	1,796,822	4.3	1,735,891	480,737	788,701	1.9	797,866	223,770
Pennsylvania	4,066,849	4.5	3,883,815	1,207,912	2,761,973	3.1	2,759,826	793,638
West Virginia	789,597	5.1	729,432	211,499	195,182	1.3	197,419	36,331
Missouri, Tennessee, and Texas	122,689	2.8	114,768	37,733	(1)		(1)	(1)
Undistributed				328,487	210,175	.5	207,810	69,060
Total 1957	10,793,389	3.7	10,358,165	3,204,248	6,278,251	2.2	6,260,240	1,624,598
At merchant plants	819,583	3.8	775,986	259,440	167,140	.8	176,172	42,825
At furnace plants	9,973,806	3.7	9,582,179	2,944,808	6,111,111	2.3	6,084,068	1,581,773
Total 1956	10,339,817	3.7	10,237,291	3,245,357	5,824,619	2.1	5,703,537	1,437,656

[1] Included with "Undistributed" to avoid disclosing individual company figures.

TABLE 56.—Benzene and toluene produced at oven-coke plants in the United States, 1941, 1947–49 (average), and 1953–57, by grades, in gallons

Year	Benzene				Toluene		
	Motor	Nitration or 1° C.	Pure commercial or 2° C.	All other	Nitration or 1° C.	Pure commercial or 2° C.	All other
1941	106,372,000	15,414,500	18,286,400	4,182,600	14,689,800	13,268,500	1,378,900
1947–49 (average)	15,246,900	38,335,100	98,395,100	2,535,900	21,407,400	5,529,200	568,600
1953	1,160,000	51,566,400	120,939,500	5,086,900	26,834,400	8,330,500	871,600
1954	3,327,100	44,383,000	92,336,600	2,718,200	24,718,800	7,775,600	888,600
1955	(1)	87,642,000	84,125,700	2,452,600	30,037,900	8,167,500	(2)
1956	(1)	74,312,800	97,393,000	2,720,200	29,673,600	7,564,500	(2)
1957	1,834,300	88,262,900	79,421,900	11,567,500	30,716,800	7,268,300	(2)

[1] Withheld to avoid disclosing individual company figures.
[2] Combined with "Pure commercial or 2° C." to avoid disclosing individual company figures.

TABLE 57.—Production of benzene (excluding Motor grade) in the United States, 1953–57, in thousand gallons [1]

Year	From tar distilleries [2]					From coke-oven operations				
	Produced	Percent of total	Sold			Produced	Percent of total	Sold		
			Quantity	Value				Quantity	Value	
				Total	Average				Total	Average
1953	32,108	11.8	19,224	$8,496	$0.44	177,593	65.1	172,405	$66,479	$0.39
1954	25,460	9.9	18,344	7,413	.40	139,438	54.3	131,857	50,958	.39
1955	34,671	11.3	24,948	7,970	.32	174,220	56.6	168,750	58,663	.35
1956	50,551	15.0	34,698	10,377	.30	174,426	51.8	173,420	59,548	.34
1957	36,112	10.9	24,787	8,911	.36	179,252	54.1	171,944	59,080	.34

Year	From petroleum refineries					Total				
	Produced	Percent of total	Sold			Produced	Percent of total	Sold		
			Quantity	Value				Quantity	Value	
				Total	Average				Total	Average
1953	63,043	23.1	41,071	$20,790	$0.51	272,744	100.0	232,700	$95,765	$0.41
1954	91,912	35.8	51,714	24,631	.48	256,810	100.0	201,915	83,002	.41
1955	98,588	32.1	71,110	30,901	.43	307,479	100.0	264,808	97,534	.37
1956	111,613	33.2	76,331	32,834	.43	336,590	100.0	284,449	102,759	.36
1957	116,184	35.0	79,773	29,991	.38	331,548	100.0	276,504	97,982	.35

[1] U. S. Tariff Commission.
[2] Includes benzene made from imported crude light oil.

TABLE 58.—Estimated consumption of commercial benzene (excluding Motor grade) in the United States, 1956–58, by uses, in thousand gallons [1]

Use	1956	1957	1958
Styrene	141,000	140,000	122,000
Phenol (synthetic)	68,000	65,000	59,000
Detergents (Dodecyl benzene)	30,000	37,000	35,000
Synthetic fibers	30,000	30,000	30,000
Aniline	16,000	13,500	11,500
DDT	13,500	12,000	10,500
Di- and Mono-chlorobenzene	10,000	9,000	8,500
Maleic anhydride	7,000	7,000	7,000
Benzene hexachloride	6,500	3,500	2,500
Diphenyls	4,500	4,500	4,000
Nitrobenzene	2,000	2,000	1,500
Miscellaneous	20,000	20,000	18,000
Export	3,000	3,000	4,500
Total	351,500	346,500	314,000

[1] Estimated by the Coal Chemicals Committee, American Coke and Coal Chemicals Institute, Washington, D. C.

COKE OVENS OWNED BY CITY GAS COMPANIES

(PUBLIC UTILITIES)

Only three oven-coke plants were operated by gas utilities in 1957, and coke production from these plants represented only 1 percent of the national output. Production of coke and coal chemicals by gas utilities has decreased drastically since 1950, because of substitution of natural gas for coke-oven gas in many areas. In 1950, gas utilities operated 12 coke plants, which produced 6 percent of all oven coke, gas, and tar, 3 percent of the crude light oil, and 5 percent of the coke-oven ammonia. Loss of markets for coke-oven gas made it difficult for the gas utilities to operate the coke plants and caused them to discontinue coking operations. Details on coal carbonized and coke, gas, and other coal-chemical materials produced in 1956–57 by gas utilities are shown in table 59.

TABLE 59.—Coke, breeze, and coal-chemical materials produced in the United States at oven-coke plants owned by city gas companies (public utilities) [1] compared with all other oven-coke plants, 1956–57

	1956			1957		
	Plants not owned by city gas companies	Plants owned by city gas companies (public utilities)	Total	Plants not owned by city gas companies	Plants owned by city gas companies (public utilities)	Total
Number of active plants	76	4	80	76	3	79
Coke:						
Produced...net tons	70,876,625	1,115,617	71,992,242	72,934,528	926,164	73,860,692
Value	$1,252,021,155	$22,192,625	$1,274,213,780	$1,332,049,959	$20,046,201	$1,352,096,160
Average per ton	$17.66	$19.89	$17.70	$18.26	$21.64	$18.31
Breeze:						
Produced...net tons	4,696,070	75,743	4,771,813	4,803,667	58,927	4,862,594
Sold...do	1,123,116	542	1,123,658	1,175,425	1,309	1,176,734
Value of sales	$7,228,058	$3,314	$7,231,372	$8,277,951	$13,042	$8,290,993
Average per ton	$6.44	$6.11	$6.44	$7.04	$9.96	$7.05
Coal carbonized:						
Bituminous...net tons	100,421,929	1,449,493	101,871,422	103,329,157	1,217,474	104,546,631
Anthracite...do	333,258	44,053	377,311	339,855	49,479	389,334
Total...do	100,755,187	1,493,546	102,248,733	103,669,012	1,266,953	104,935,965
Value	$940,197,699	$15,681,107	$955,878,806	$1,025,505,093	$14,259,820	$1,039,764,913
Average per ton	$9.33	$10.50	$9.35	$9.89	$11.26	$9.91
Coke—						
Used by producing companies:						
Net tons	61,299,892	66,236	61,366,128	64,317,728	73,006	64,390,734
Value	$1,078,297,582	$1,079,954	$1,079,377,536	$1,166,091,138	$1,234,480	$1,167,325,618
Commercial sales:						
Net tons	8,979,159	1,016,014	9,995,173	7,958,511	698,935	8,657,446
Value	$163,399,726	$20,396,353	$183,796,079	$153,202,375	$15,732,762	$168,935,137
Coal-chemical materials:						
Tar:						
Produced...gallons	822,717,113	10,109,929	832,827,042	864,822,725	8,651,627	873,474,352
Sold...do	405,795,701	10,490,686	416,286,387	433,452,572	8,536,306	441,988,878
Value of sales	$48,824,189	$1,304,708	$50,128,897	$56,449,756	$1,059,161	$57,508,917
Ammonia:						
Produced (NH_3 equivalent of all forms)...pounds	495,701,466	6,915,675	502,617,141	517,046,895	5,626,469	522,673,364
Liquor (NH_3 content):						
Produced...do	34,725,852	635,657	35,361,509	34,682,620	-------	34,682,620
Sold...do	31,962,418	625,060	32,587,478	31,588,045	57,936	31,645,981
Value of sales	$1,186,642	$18,751	$1,205,393	$1,054,726	$3,610	$1,058,336
Sulfate: [2]						
Produced...pounds	1,788,076,830	24,360,038	1,812,436,868	1,871,091,030	21,825,067	1,892,916,097
Sold...do	1,819,755,174	26,887,985	1,846,643,159	1,998,449,757	20,640,085	2,019,089,842
Value of sales	$30,513,577	$483,487	$30,997,064	$28,885,767	$323,376	$29,209,143

Gas:						
Produced ... M cubic feet	1,040,521,257	14,807,425	1,055,328,682	1,078,125,123	12,720,747	1,090,845,870
Disposal of surplus:						
Used under boilers:						
M cubic feet	63,371,967	971	63,372,938	70,672,947	----------	70,672,947
Value	$10,325,042	$524	$10,325,566	$12,912,269	----------	$12,912,269
Average per M cubic feet	$0.163	$0.540	$0.163	$0.183	----------	$0.183
Used in steel or allied plants:						
M cubic feet	497,279,254	----------	497,279,254	528,492,057	----------	528,492,057
Value	$108,006,604	----------	$108,006,604	$122,200,566	----------	$122,200,566
Average per M cubic feet	$0.217	----------	$0.217	$0.231	----------	$0.231
Distributed through city mains:						
M cubic feet	53,820,501	10,482,482	64,302,983	42,462,102	8,485,865	50,947,967
Value	$21,478,423	$4,805,627	$26,284,050	$17,854,538	$4,682,999	$22,537,537
Average per M cubic feet	$0.399	$0.458	$0.409	$0.420	$0.552	$0.442
Sold for industrial use:						
M cubic feet	37,342,206	1,298,259	38,640,465	36,240,114	1,006,554	37,246,668
Value	$6,445,354	$420,076	$6,865,430	$6,778,317	$328,937	$7,107,254
Average per M cubic feet	$0.173	$0.324	$0.178	$0.187	$0.327	$0.191
Crude light oil:						
Produced ... gallons	290,361,406	610,803	290,972,209	300,696,929	391,417	301,088,346
Sold ... do	14,007,499	620,665	14,628,164	14,147,597	408,964	14,556,561
Value of sales	$3,069,933	$106,778	$3,176,711	$3,023,972	$59,299	$3,083,271
Light-oil derivatives:						
Produced ... gallons	234,228,862	----------	234,228,862	244,258,357	----------	244,258,357
Sold ... do	229,816,855	----------	229,816,855	231,898,325	----------	231,898,325
Value of sales	$75,054,376	----------	$75,054,376	$75,223,000	----------	$75,223,000
All other coal-chemical materials, value of sales	$29,573,009	$11,808	$29,584,817	$26,923,067	$8,912	$26,931,979

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[1] Coke ovens built by city gas companies. Does not include independent oven-coke plants that may sell gas to public-utility companies for distribution.

[2] Includes diammonium phosphate and ammonium thiocyanate.

Fuel Briquets and Packaged Fuel

By Eugene T. Sheridan and Maxine M. Otero

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GENERAL SUMMARY

THE DEMAND for fuel briquets and packaged fuel continued to decline in 1957, and production of both fuels was about one-fourth less than in 1956. These fuels are used principally for residential heating in the United States; however, in recent years their use has decreased, chiefly because of the increased use of fuel oil and natural gas for heating.

Nine States produced fuel briquets and 7 States packaged fuel in 1957. Wisconsin led in briquet production and Michigan in production of packaged fuel. Both States are in the Central States region, where about half of the fuel briquets and virtually all of the packaged fuel were produced.

Only 17 briquet plants and 23 packaged-fuel plants were active in 1957—a decrease of 4 and 3, respectively, from the number operating in 1956 and less than half the number of each type active in 1947–49.

The total value of output of each fuel also was lower in 1957 than in 1956; however, average values per ton were higher, due principally to higher raw-material costs.

In 1957, as in 1956, low-volatile bituminous coal was the principal raw fuel used for manufacturing both briquets and packaged fuel (over half of the fuel briquets and all of the packaged fuel were made from this fuel). Binding materials were petroleum asphalt and starch; fuel-briquet plants used asphalt exclusively, and all but one packaged-fuel plant used starch. Briquets require more binder than packaged fuel. Briquet binders generally constitute about 7 to 8 percent of the raw materials, whereas binders for packaged fuel comprise less than 1 percent.

Briquets differ from packaged fuel in appearance, shape, and composition. Briquets usually are small, pillow-shaped objects, 2 to 4 inches in length, weighing 2 to 4 ounces. Packaged fuel consists of 3- to 4-inch cubes, 6 or 8 of which are wrapped in heavy paper to form a package weighing 10 to 15 pounds. Briquets are made with a water-insoluble binder and are designed for rough handling and outdoor storage, whereas packaged fuel generally is made with a water-soluble binder and must be stored indoors to prevent deterioration.

Most packaged fuel is sold directly to consumers in small quantities. Briquets have a much wider distribution and usually are sold through wholesalers and retailers.

TABLE 1.—Salient statistics of the fuel-briquetting and packaged-fuel industry in the United States, 1947–49 (average) and 1954–57

	1947–49 (average)	1954	1955	1956	1957
FUEL BRIQUETS					
Production net tons	2, 901, 348	1, 624, 462	1, 629, 542	1, 518, 540	1, 104, 781
Value of production	$31, 805, 000	$19, 161, 635	$19, 037, 987	$18, 221, 686	$14, 802, 033
Average value per net ton, f. o. b. plant	$10. 96	$11. 80	$11. 68	$12. 00	$13. 40
Imports [1] net tons	360	239	----------	318	850
Exports [1] do	207, 928	98, 908	106, 294	107, 452	86, 464
Apparent consumption [2] do	2, 693, 780	1, 525, 793	1, 523, 248	1, 411, 406	1, 019, 167
World production do	62, 000, 000	[3]109,200,000	[3]115,100,000	[3]119,400,000	121, 800, 000
PACKAGED FUEL					
Production net tons	155, 281	77, 360	69, 212	64, 960	47, 287
Value of production	$2, 618, 238	$1, 416, 606	$1, 194, 045	$1, 381, 880	$1, 022, 262
Average value per net ton, f. o. b. plant	$16. 86	$18. 31	$17. 25	$21. 27	$21. 62

[1] Compiled from the records of the U. S. Department of Commerce. Excludes exports of briquets made from petroleum coke and residual carbon from the manufacture of oil gas.

[2] Production plus imports minus exports.

[3] Revised figure.

SCOPE OF REPORT

The annual collection and publication of data on the fuel-briquet industry have been continuous since 1907, except for 1910, when no canvass was conducted. Packaged-fuel statistics are continuous since 1935, when the Bureau of Mines made its first canvass.

Except where noted, all statistics in this chapter were based upon producers' reports, supplied voluntarily by manufacturers of fuel briquets and packaged fuel in the United States.

In 1957, 22 fuel-briquet plants were canvassed, and replies were received from 20; 17 plants reported production, and 3 plants were reported idle but not abandoned. Of 32 packaged-fuel plants canvassed, 29 replied. Of this number, 23 reported production, 3 were abandoned, and 3 were idle but not abandoned. No attempt was made to estimate production for nonreporting plants, as these plants probably were either idle or abandoned.

The value of production of both fuel briquets and packaged fuel is based upon the value of sales, f. o. b. plant, as reported by producers.

The average of the 3-year period, 1947–49, is used as a base for measuring production and consumption trends, and the standard unit of measurement is the short ton of 2,000 pounds.

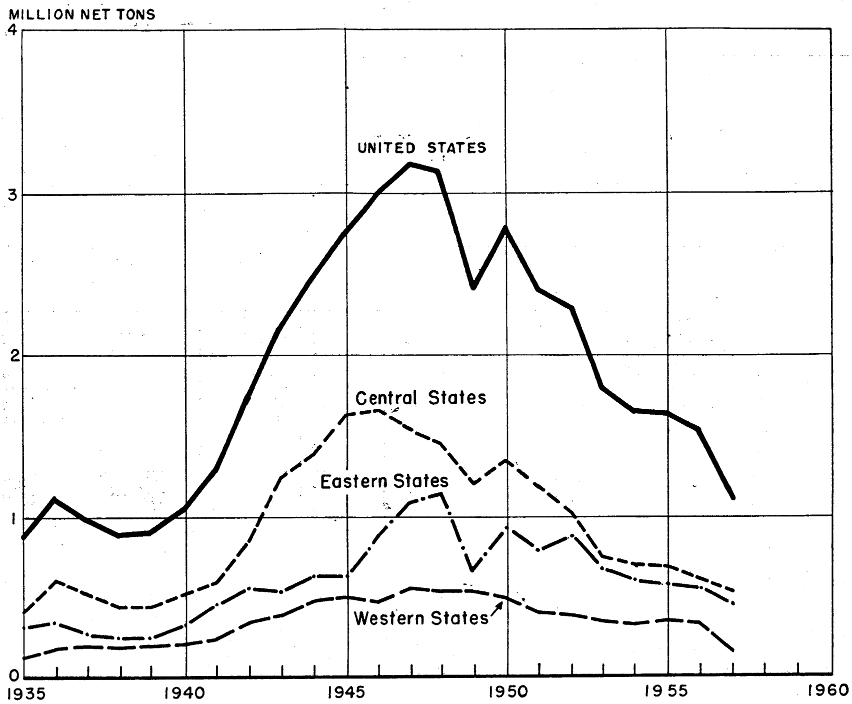

FIGURE 1.—Production of fuel briquets in the United States, 1935–57, by regions.

FUEL BRIQUETS

CAPACITY

The annual productive capacity of the fuel-briquet industry decreased 17 percent in 1957, chiefly because 4 plants with a combined capacity of 341,000 tons discontinued operations. In addition, however, 4 other plants with a combined capacity of 635,000 tons in 1956 decreased their capacities 30 to 50 percent.

Since 1948, 19 fuel-briquet plants have ceased operations, and total capacity has decreased 34 percent. The rate of operation also has dropped steadily, from 67 percent of capacity in 1948 to 36 percent in 1957.

Every operating plant in 1957 had an annual capacity exceeding 25,000 tons.

PRODUCTION

Since 1947 briquet production has declined steadily, and in 1957 only about one-third as many briquets were produced as in the base years 1947–49. Production in 1957 decreased 27 percent from 1956, partly because 4 plants ceased operations but mainly because all but 1 plant produced fewer briquets than in 1956.

Briquets were produced in 9 States in 1957. As in 1956, the principal centers of production were the mining districts of southwestern West Virginia and the dock areas of northern and eastern

TABLE 2.—Annual capacity and production of briquetting plants in the United States, 1953–57

	Active plants	Annual capacity (net tons)	Production	
			Net tons	Percent of annual capacity
1953	26	4,216,000	1,780,061	42.2
1954	25	4,161,000	1,624,462	39.0
1955	23	3,841,000	1,629,542	42.4
1956	21	3,716,000	1,518,540	40.9
1957:				
Plants with capacity of—				
Less than 25,000 tons	----	----	----	----
25,000 to less than 100,000 tons	7	378,000	136,915	36.2
100,000 to less than 200,000 tons	4	450,000	212,429	47.2
200,000 to less than 400,000 tons	3	760,000	227,284	29.9
400,000 tons or more	3	1,500,000	528,153	35.2
Total	17	3,088,000	1,104,781	35.8
Plants with production of—				
Less than 5,000 tons	2	(1)	(1)	(1)
5,000 to less than 10,000 tons	----	----	----	----
10,000 to less than 25,000 tons	4	360,000	85,248	23.7
25,000 to less than 100,000 tons	7	1,028,000	382,473	37.2
100,000 tons or more	4	1,700,000	637,060	37.5
Total	17	3,088,000	1,104,781	35.8

(1) Combined with 10,000 to less than 25,000 tons to avoid disclosing individual company figures.

Wisconsin. Wisconsin led in production, with 40 percent of the total, and West Virginia was second. Output in Wisconsin came from 6 plants; only 2 plants were active in West Virginia. Production in both States declined 19 and 18 percent, respectively, from 1956. Missouri and Pennsylvania produced relatively large tonnages, but their output also decreased in 1957. These 4 States were the largest producers, their combined output being 93 percent of the total.

TABLE 3.—Production and value of fuel briquets in the United States, 1956–57, by regions

Region [1]	1956				1957			
	Active plants	Production (net tons)	Value		Active plants	Production (net tons)	Value	
			Total	Average			Total	Average
Eastern States	4	561,383	$5,749,117	$10.24	4	448,199	$4,982,259	$11.12
Central States	10	619,321	8,869,700	14.32	9	513,217	7,781,672	15.16
Western States	7	337,836	3,602,869	10.66	4	143,365	2,038,102	14.22
Total	21	1,518,540	18,221,686	12.00	17	1,104,781	14,802,033	13.40

[1] Eastern States include Pennsylvania and West Virginia; Central States—Illinois, Indiana, Michigan, and Wisconsin; Western States (west of the Mississippi River)—Arkansas, Missouri, and Washington.

TABLE 4.—Production of fuel briquets in the United States in 1957, by months

Month	Net tons	Month	Net tons	Month	Net tons
January	174,312	May	74,965	September	92,996
February	103,605	June	60,559	October	147,416
March	38,426	July	35,259	November	139,234
April	57,080	August	57,712	December	123,217

As briquets are used principally for space heating, production is highest in the winter. Production in 1957 ranged from 174,312 tons in January to 35,259 tons in July.

Raw Fuels.—Low-volatile bituminous coal was the principal raw fuel used for manufacturing fuel briquets in 1957. Other fuels used, in order of importance, were petroleum coke, Pennsylvania anthracite, high-volatile bituminous coal, semianthracite, other anthracite, residual carbon, and bituminous coke. Of the total, 62 percent was low-volatile bituminous coal, 18 percent petroleum coke, and 15 percent Pennsylvania anthracite. The percentages of petroleum coke and Pennsylvania anthracite were comparable to those used in 1956, but there was a considerable increase in the percentage of low-volatile bituminous coal consumed in 1957. Only a small quantity of residual carbon was used in 1957, as 1 plant in Oregon was abandoned in December 1956 and 1 plant in Washington shut down permanently after producing 7 months in 1957. These plants manufactured briquets from residual carbon obtained from oil gas. No briquets were made from lignite char in 1957, as the plant in North Dakota that used this material was abandoned.

Fifteen percent of the raw fuels consisted of yard screenings, but the major part comprised screened slack from bituminous-coal mines, petroleum coke from refineries, and Pennsylvania anthracite fines. No plants used yard screenings exclusively. Six plants used yard screenings in addition to materials from other sources, and 11 plants used only raw fuels other than yard screenings.

There is considerable difference in the value of raw fuels used for briquets. Plants in the Eastern States, which are at or near the source of their raw fuels, had the lowest average value per ton. Plants in the Central States, particularly in Wisconsin where 86 percent of the region's briquets were produced, had the highest average value per ton owing to additional transportation charges on the raw materials. Plants in the Western States used mostly local fuels, but these fuels cost more than fuels consumed in Eastern States plants. The average value per ton for all raw fuels used in 1957 was $8.28.

TABLE 5.—**Raw fuels used in making fuel briquets in the United States in 1957**

Type	Number of plants	Used		
		Net tons	Value	
			Total	Average
Anthracite:				
Pennsylvania	8	155,985	$1,098,653	$7.04
Other than Pennsylvania	1	(1)	(1)	(1)
Semianthracite	2	(1)	(1)	(1)
Bituminous coal:				
Low-volatile	11	652,632	5,526,199	8.47
High-volatile	1	(1)	(1)	(1)
Petroleum coke	6	186,970	1,805,427	9.66
Residual carbon from manufacture of oil gas	1	(1)	(1)	(1)
Coke	1	(1)	(1)	(1)
Undistributed		54,930	266,906	4.86
Total	[2] 17	1,050,517	8,697,185	8.28

[1] Included with "Undistributed" to avoid disclosing individual company figures.

Some plants used more than 1 type of raw fuel; hence the sum of the plants exceeds the total shown.

Binders—Petroleum asphalt was used as a binder in manufacturing fuel briquets in 1957 by all plants that employed a binder. However, one plant that made briquets from residual carbon did not use a binder.

Petroleum asphalt is the ideal binder for briquets because, in addition to its binding properties, it (1) is relatively inexpensive, (2) is water insoluble, and (3) has a low ash content. Binders generally constitute 6 to 8 percent by weight of the raw materials in briquets. In 1957 an average of 146 pounds of asphalt was used in manufacturing each ton of fuel briquets by producers that used a binder.

The average value of the binder consumed in manufacturing 1 ton of briquets in 1957 was $2—a 9-percent increase over 1956. The increase was due to a general increase in the price of asphalt in all regions. In 1957, 80,131 tons of asphalt valued at $2.2 million was consumed by 16 plants. The average value per ton of all binding materials (including a small quantity of spray oil) was $27.64.

TABLE 6.—Quantity and value of raw materials used in making fuel briquets in the United States and quantity and value of sales in 1957, by regions

Region	Raw materials used					
	Fuels			Binders [2]		
	Net tons	Value		Net tons	Value	
		Total	Average		Total	Average
Eastern States	416, 804	$2, 574, 461	$6. 18	31, 393	$981, 272	$31. 26
Central States	501, 821	5, 093, 149	10. 15	37, 919	978, 597	25. 81
Western States	131, 892	1, 029, 575	7. 81	11, 473	272, 949	23. 79
Total	1, 050, 517	8, 697, 185	8. 28	80, 785	2, 232, 818	27. 64

Region	Total raw materials			Fuel briquets sold		
	Net tons	Value		Net tons	Value	
		Total	Average		Total	Average
Eastern States	448, 197	$3, 555, 733	$7. 93	445, 672	$4, 952, 133	$11. 11
Central States	539, 740	6, 071, 746	11. 25	510, 360	7, 740, 585	15. 17
Western States	143, 365	1, 302, 524	9. 09	143, 889	2, 045, 348	14. 21
Total	1, 131, 302	10, 930, 003	9. 66	1, 099, 921	14, 738, 066	13. 40

[1] Eastern States include Pennsylvania and West Virginia; Central States—Illinois, Indiana, Michigan, and Wisconsin; Western States (west of the Mississippi River)—Arkansas, Missouri, and Washington.

[2] Includes 654 tons of spray oil used by 2 plants for dustproofing briquets.

SHIPMENTS

Although produced in only 9 States, fuel briquets were distributed in 33 States, the District of Columbia, Canada, and Bolivia in 1957.

Except for a few States, however, the bulk of the output was consumed in the producing State or nearby States. The terms "distribution" and "consumption" are used synonymously, as it is assumed that briquets are consumed in the State where shipments terminate.

Wisconsin, the leading briquet-producing State in 1957, was also the largest consumer, using 19 percent of the total quantity distributed. In addition to supplying its own needs (93 percent of all briquets consumed in Wisconsin was produced within the State), Wisconsin shipped more than half its production to 7 other States and Canada. Most of Wisconsin's out-of-State shipments terminated in neighboring States, Minnesota receiving 52 percent. West Virginia, the second largest producer, shipped virtually all of its production to 17 other States and Canada. Michigan, Indiana, and Illinois were the leading consumers of briquets made in West Virginia; together they consumed 58 percent of West Virginia's out-of-State shipments. Only about 8 percent of the briquets produced in Pennsylvania remained within the State; the remainder was shipped to 19 States, the District of Columbia, and Canada.

Missouri was second to Wisconsin in briquet consumption, followed by Michigan, Minnesota, and Indiana. Missouri produced 77 percent of its requirements, whereas Michigan and Indiana received most of their briquets from other States. Minnesota received 10 percent of the total briquet shipments, all from other States.

According to reports from producers, exports amounted to 6 percent of total shipments. However, data collected by the Bureau of Mines on exports differ from those compiled by the Bureau of the Census because some briquets shipped to certain States by producers eventually may be shipped to other countries by export firms in those States. Moreover, Bureau of Mines data include briquets made exclusively from petroleum products, whereas the Bureau of the Census data exclude them.

Seventy-seven percent of the total shipments in 1957 went by rail; however, the mode of transportation varied considerably in different regions. Rail shipments of briquets in the Eastern States were 98 percent of the total for that region, compared with only 24 percent in the Western States and 73 percent in the Central States.

Shipments by States of origin cannot be shown owing to the small number of producing companies in each State.

TABLE 7.—Destination of shipments of fuel briquets, 1956–57, in net tons

[Based upon reports from producers showing destination of briquets used or sold]

Destination	1956	1957	Destination	1956	1957
Arkansas	1,793	1,163	North Carolina	31,934	28,399
California	10,173	----------	North Dakota	60,571	30,606
Connecticut	1,875	1,199	Ohio	84,474	65,123
Delaware	20	38	Oklahoma	148	1,403
District of Columbia	588	340	Oregon	52,727	----------
Florida	208	150	Pennsylvania	8,732	6,757
Illinois	82,395	73,993	Rhode Island	438	428
Indiana	114,994	98,558	South Carolina	6,576	2,537
Iowa	32,125	31,864	South Dakota	50,886	37,534
Kansas	6,425	6,062	Tennessee	1,869	1,518
Kentucky	4,561	4,135	Texas	43	----------
Maine	5,087	4,129	Vermont	1,260	929
Maryland	6,220	5,301	Virginia	36,698	36,122
Massachusetts	5,939	3,748	Washington	22,221	1,181
Michigan	160,790	127,462	West Virginia	1,091	845
Minnesota	134,314	109,335	Wisconsin	255,458	206,652
Missouri	167,864	132,690			
Nebraska	10,889	6,477	Total	1,371,047	1,033,836
New Hampshire	2,101	1,500	Exported	148,808	68,689
New Jersey	1,494	1,327			
New York	6,066	4,331	Grand total	1,519,855	1,102,525

TABLE 8.—Shipments of fuel briquets in the United States, 1956–57, by methods of transportation, in net tons [1]

Origin	1956			1957		
	Rail	Truck [2]	Total	Rail	Truck [2]	Total
Eastern States	550, 644	10, 535	561, 179	436, 877	8, 795	445, 672
Central States	456, 729	160, 002	616, 731	374, 066	136, 294	510, 360
Western States	156, 790	180, 162	336, 952	34, 149	109, 740	143, 889
Total	1, 164, 163	350, 699	[3] 1, 514, 862	845, 092	254, 829	[3] 1, 099, 921

[1] Includes shipments destined for export, as reported by producers directly to the Bureau of Mines.
[2] Includes small quantity shipped by barge.
[3] An additional 4,993 tons was used by 2 producers as fuel at their plants in 1956 and 2,604 tons by 1 producer in 1957.

VALUE AND PRICE

The total value of briquet production in 1957 declined 19 percent from 1956, chiefly because of decreased production. However, raw-material and manufacturing costs were higher in 1957, so that the percentage decrease in total value was lower than the percentage decrease in production. The value of production is calculated by multiplying total production by the average receipts per ton, f. o. b. plant, on commercial sales. According to producers' reports, this was $13.40 per ton, an increase of 12 percent over 1956 and 22 percent above the 1947–49 average.

As in preceding years, briquets produced in the Eastern States in 1957 had the lowest average value per ton, chiefly because the proximity of plants to anthracite and bituminous-coal fields eliminated extensive transportation charges on raw fuels. Briquets produced in the Central States had the highest average value per ton, as most of the raw fuels were produced in other areas and their costs included higher transportation charges.

The average value per ton for raw materials in 1957 was $9.66—an increase of 9 percent over 1956. The increase was due to approximately equal percentage increases in the cost of raw fuels and binders.

Virtually all briquets marketed in 1957 were sold in bulk. A small quantity, however, was packaged and sold in bags and cartons. The average value per ton, f. o. b. plant, for bulk sales was $13.39 and for packaged sales, $24.58 per ton. The average value per ton, f. o. b. plant, for total sales was $13.40.

The total value of production is slightly higher than that of sales, because one producer consumed 2,604 tons of his output for heating purposes.

FOREIGN TRADE [1]

Virtually all briquets exported by the United States in 1957 were shipped to Canada. A small quantity—less than 1 percent of the total—was shipped to Bolivia. Total exports decreased 20 percent from 1956, and less than half as many briquets were exported in 1957 as in 1947–49. Most of the exported briquets were produced in Pennsylvania and Wisconsin.

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[1] Figures on imports and exports compiled by Mae B. Price and Elsie D. Jackson, Division of Foreign Activities, Bureau of Mines, from records of the Bureau of the Census.

Imports, nearly all of which came from Canada, were 850 tons, slightly higher than in 1956.

Export data (see table 9) on fuel briquets are compiled and published by the Bureau of the Census and include only briquets made from coal and coke.

TABLE 9.—Fuel briquets (coal and coke) exported from the United States' 1955–57, by countries of destination and customs districts

[Bureau of the Census]

	1955		1956		1957	
	Net tons	Value	Net tons	Value	Net tons	Value
COUNTRY						
North America:						
Canada	94,179	$1,454,304	107,122	$1,709,528	86,242	$1,376,904
Honduras	25	594	-----	-----	-----	-----
Mexico	534	4,272	-----	-----	-----	-----
Total	94,738	1,459,170	107,122	1,709,528	86,242	1,376,904
South America:						
Argentina	50	1,980	-----	-----	-----	-----
Bolivia	-----	-----	-----	-----	222	5,678
Brazil	-----	-----	130	3,245	-----	-----
Chile	343	3,331	-----	-----	-----	-----
Total	393	5,311	130	3,245	222	5,678
Asia: Japan	11,163	99,666	-----	-----	-----	-----
Africa: Liberia	-----	-----	200	3,467	-----	-----
Grand total	106,294	1,564,147	107,452	1,716,240	86,464	1,382,582
CUSTOMS DISTRICT						
Buffalo	38,809	653,677	(1)	(1)	34,219	588,243
Dakota	19,083	251,106			16,683	233,825
Duluth and Superior	13,015	184,358			12,148	176,250
Los Angeles	534	4,272			-----	-----
Maine and New Hampshire	794	15,877			-----	-----
Maryland	343	3,331			-----	-----
Massachusetts	-----	-----			30	705
Michigan	2,523	32,815			4,651	52,762
New Orleans	25	594			222	5,678
New York	50	1,980			-----	-----
Ohio	45	283			90	1,053
Rochester	2,062	15,918			-----	-----
St. Lawrence	15,464	271,563			15,308	285,219
Vermont	-----	-----			1,203	15,457
Virginia	11,163	99,666			-----	-----
Washington	34	717			-----	-----
Other [2]	2,350	27,990			1,910	23,390
Total	106,294	1,564,147	107,452	1,716,240	86,464	1,382,582

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[1] Data not available.

[2] Estimated from sample data; district data not available.

TECHNOLOGY

The Fifth Biennial Briquetting Conference was held at Glenwood Springs, Colo., August 19–21, 1957. Representatives of producers, equipment manufacturers, binder suppliers, and members of research and technical organizations attended.

Several papers on binders were presented that were of interest to fuel-briquet manufacturers. Studies on binders are extremely important because the cost of binders is a significant factor in total manufacturing costs of fuel briquets. Mr. L. C. Krchma, Socony Mobile Oil Co., reported on the influence of mix properties on briquetting.

His investigative studies were made using a continuous-roll type of briquetting press in which the density of briquets and the output per day normally depend directly upon the density of the briquet mix. He examined two variables—binder and moisture—to determine their respective effects on mix density and observed that asphalt acts not only as a binder but also improves the mix density and that moisture complements this effect. He also found that two other properties—internal friction and cohesion—vary considerably with asphalt content. A low-asphalt content gives high internal friction and low cohesion, resulting in a lowc ompressive strength. High-asphalt contents result in low cohesion and low internal friction, with further declines in strength.

A method for manufacturing briquets using considerably less binder was reported by Hidetoshi Matsunami, Tokyo, Japan. In this method, molten pitch is emulsified with spent sulfite liquor and sprayed over wet coal running into a mixer. Briquets are then made according to prescribed procedures and passed over a specially designed curing installation. A curing time of 16 minutes yielded strong briquets and reduced moisture content from about 15 percent to 8. With additional curing time, pitch-emulsion briquets increased steadily in strength; briquets made with pitch alone decreased in strength.

A new method for producing coal briquets using only about half the normal amount of binder is described in a British patent (No. 764,903) issued in 1957. A binder is prepared by melting 3 parts of anthracene oil in 97 parts of pitch, then adding 0.1 part of an alkyl-aryl sulfonate dissolved in 35 parts of water. Vigorous and rapid stirring gives a fine emulsion which is sprayed to produce droplets. The droplets are solidified into separate particles, and measured quantities of the particles are added to finely divided coal. The mix is then homogenized and subjected to superheated steam. The steam causes sudden foaming, so that the particles of the emulsion are attached, very finely distributed, to the surface of the coal particles. The mix is then briquetted in the usual manner in a heated briquet press, and briquets of excellent quality are obtained with only 3.5 to 4 parts of binder per 100 parts of coal.[2]

High-pressure briquetting presses are used in various industrial applications and one that has been used effectively in briquetting German brown coals and iron-ore fines is the Glomera high-pressure briquettor. A paper prepared by Mr. Konrad Ruckstuhl, the developer of this press, was given at the Fifth Biennial Briquetting Conference. This machine, manufactured by Pawert, Ltd., Basel, Switzerland, is essentially an extrusion press that converts waste material into solid briquets without a binder.

PACKAGED FUEL

CAPACITY

The annual productive capacity of the packaged-fuel industry in 1957 was 150,200 net tons—14 percent less than in 1956 and 61 percent less than the average capacity in 1947–49. Five plants with a total capacity of 20,000 tons operated in 1956 but not in 1957, and 3 operating plants decreased their capacities by a total of 10,700 tons. These decreases were offset somewhat by 2 plants that were idle in 1956 but resumed operations in 1957. Most packaged-fuel plants are small, and 17 of the 23 active plants had a rated annual capacity of less than 5,000 tons.

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[2] Elod, E., and Gollmer, W., Production of Coal Briquets: Fuel Abs. vol. 22, No. 3, abs. 2352, September 1957.

TABLE 10.—Annual capacity and production of packaged-fuel plants in the United States, 1953–57

	Active plants	Annual capacity (net tons)	Production	
			Net tons	Percent of annual capacity
1953	37	232,850	79,732	34.2
1954	37	243,300	77,360	31.8
1955	31	198,400	69,212	34.9
1956	26	174,600	64,960	37.2
1957:				
Plants with capacity of—				
Less than 5,000 tons	17	39,400	8,796	22.3
5,000 to less than 10,000 tons	2	[1] 22,800	[1] 3,633	15.9
10,000 to less than 15,000 tons	1			
15,000 to less than 25,000 tons	2	[1] 88,000	[1] 34,858	39.6
25,000 tons or more	1			
Total	23	150,200	47,287	31.5
Plants with production of—				
Less than 1,000 tons	18	[1] 62,200	[1] 12,429	20.0
1,000 to less than 3,000 tons	2			
3,000 to less than 5,000 tons	--------	--------	--------	--------
5,000 to less than 10,000 tons	2	[1] 88,000	[1] 34,858	39.6
10,000 tons or more	1			
Total	23	150,200	47,287	31.5

[1] Combined to avoid disclosing individual company figures.

PRODUCTION

The demand for packaged fuel continued to decline in 1957, and production decreased 27 percent. This decrease was due chiefly to a decrease in the number of operating plants; also, most of the active plants operated at lower rates, and the production rate for the industry was 5.7 points lower than in 1956. Only 7 States produced packaged fuel in 1957, and output decreased in all States except Virginia. Michigan was the largest producer with 51 percent of the total, followed by Wisconsin, Ohio, and Indiana. These 4 States produced 97 percent of the packaged fuel manufactured in 1957. Of the 23 plants in operation, 20 produced less than 3,000 tons. Like fuel briquets, packaged fuel has a seasonal demand, and monthly output ranged from 8,470 tons in January to 404 tons in June.

Raw Fuels.—Low-volatile bituminous coal was the only fuel used for manufacturing packaged fuel in 1957. In preceding years, small quantities of high-volatile bituminous coal, semianthracite, and petroleum coke also were used. Nineteen plants used yard screenings as raw material, but more than three-fourths of the raw fuel came from other sources and consisted chiefly of coal fines that were screened at mines or accumulated at loading or unloading points. The average value for raw fuel was $10.47 per ton.

TABLE 11.—Production and value of packaged fuel in the United States, 1956–57, by States

State	1956				1957			
	Active plants	Production (net tons)	Value		Active plants	Production (net tons)	Value	
			Total	Average			Total	Average
Indiana	3	8,674	$194,670	$22.44	3	6,998	$139,960	$20.00
Michigan	7	33,359	733,027	21.97	5	24,159	542,437	22.45
Ohio	9	7,358	104,599	14.22	10	7,113	132,101	18.57
Other States [1]	7	15,569	349,584	22.45	5	9,017	207,764	23.04
Total	26	64,960	1,381,880	21.27	23	47,287	1,022,262	21.62

[1] Comprises 1 plant each in Illinois, Minnesota (2 plants in 1956), and Virginia and 2 plants in Wisconsin.

TABLE 12.—Production of packaged fuel in the United States in 1957, by months

Month	Net tons	Month	Net tons	Month	Net tons
January	8,470	May	1,041	September	2,361
February	6,574	June	404	October	4,797
March	4,664	July	1,301	November	5,650
April	4,364	August	2,237	December	5,424

Binders.—Starch in the form of corn or wheat flour is generally used as a binder for packaged fuel, and all plants but one used starch in 1957. Starch apparently is the preferred binder, because it produces a strong block with a relatively low binder-to-fuel ratio; moreover, it does not add ash or volatile matter to the product. Although starch has a much higher average value per ton ($124 in 1957) than asphalt, it costs less per ton of finished product because less is required. In 1957 about 14 pounds of starch (value—$0.87) was used in manufacturing each ton of packaged fuel by plants that employed starch as a binder. In comparison, 146 pounds of asphalt (value—$2) was used in manufacturing each ton of fuel briquets.

Table 13 lists, by regions, the number of tons and value of binders used for packaged fuel in 1957. The total average value per ton for binders consumed ($59.12) is lower than the average value of starch binders because one plant in the Central States region produced considerable packaged fuel using asphalt as binding material.

TABLE 13.—Quantity and value of raw materials used in making packaged fuel in the United States and quantity and value of sales in 1957, by regions

Region[1]	Raw materials used					
	Fuels			Binders		
	Net tons	Value		Net tons	Value	
		Total	Average		Total	Average
Eastern States	7,968	$69,763	$8.76	59	$7,289	$123.54
Central States	39,624	428,744	10.82	842	45,982	54.61
Western States	(2)	(2)	(2)	(2)	(2)	(2)
Total	47,592	498,507	10.47	901	53,271	59.12

Region[1]	Total raw materials			Packaged fuel sold		
	Net tons	Value		Net tons	Value	
		Total	Average		Total	Average
Eastern States	8,027	$77,052	$9.60	7,978	$151,996	$19.05
Central States	40,466	474,726	11.73	39,236	868,585	22.14
Western States	(2)	(2)	(2)	(2)	(2)	(2)
Total	48,493	551,778	11.38	47,214	1,020,581	21.62

[1] Eastern States include Ohio and Virginia; Central States—Illinois, Indiana, Michigan, and Wisconsin; Western States (west of the Mississippi River)—Minnesota.

[2] Included with Central States to avoid disclosing individual company figures.

SHIPMENTS

All packaged fuel was shipped by truck in 1957, with 84 percent delivered locally. The remainder was reported as sent to other than local destinations, but because of the physical characteristics of packaged fuel this fuel probably was consumed within the producing State or in nearby States. A few producers use vending machines to dispense their product, and, although all packaged fuel was reported delivered by truck, a small quantity was picked up by consumers in automobiles. No packaged fuel has been shipped by rail since 1953.

TABLE 14.—Shipments of packaged fuel in the United States, 1953–57, by methods of transportation, in net tons

Year	Shipped by truck			Shipped by rail	Total
	Local sales	Other than local sales	Total		
1953	68,275	8,254	76,529	3,582	80,111
1954	78,464	----------	78,464	----------	78,464
1955	57,051	12,159	69,210	----------	69,210
1956	51,933	11,482	63,415	----------	63,415
1957	39,739	7,475	47,214	----------	47,214

VALUE AND PRICE

The total value, f. o. b. plants, of packaged fuel manufactured in 1957 decreased 26 percent to $1,022,262. This decrease was in accord with the substantial decrease in production in 1957; however, average values per ton were slightly higher than in 1956.

The average value of total raw materials was slightly above 1956, owing chiefly to a small increase in the value of the raw fuels used; however, this increase was offset somewhat by a decrease in the average value per ton of binders consumed.

Packaged fuel has a considerably higher value than fuel briquets, chiefly because manufacturing costs are higher and marketing methods differ. Packaged-fuel plants usually are much smaller than briquet plants, and most packaged fuel is sold in small quantities directly to the consumer. Thus, the values of packaged-fuel sales generally are the equivalent of retail prices. In 1957 the average sales value per ton of all packaged fuel was 61 percent greater than the average sales value of fuel briquets.

WORLD REVIEW[3]

The estimated world production of fuel briquets and packaged fuel in 1957 was 121.8 million tons. As in previous years, briquet output was greatest in Europe where 95 percent of all briquets were manufactured in 1957. The chief producer of briquets was East Germany with nearly half of total world output. West Germany, also a large producer, contributed 22 percent of the world total in 1957. Both countries have extensive reserves of lignite, the chief raw material used in their briquets. Briquetting of brown coal has been practiced in Germany on a large scale for many years, and briquets have been used extensively for residential and industrial heating and for railroad fuel. The Soviet Union, with an estimated production of 9.4 million tons, provided 8 percent of the world total and France, with 9.1 million tons, 7 percent. Although briquets were produced in 21 European countries, 90 percent of the briquets manufactured in Europe came from Germany, France, and the U. S. S. R. Japan and the United States were the only non-European countries that produced more than 1 million tons. Japan produced 3 million tons and ranked fourth in world production, whereas the United States produced 1.1 million tons and ranked ninth.

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[3] Figures on world production compiled by Pearl J. Thompson, Division of Foreign Activities, Bureau of Mines.

TABLE 15.—World production of fuel briquets and packaged fuel, 1953–57, by countries, in thousand net tons [1]

Country	1953	1954	1955	1956	1957
North America:					
Canada	708	831	654	752	395
United States:					
Briquets	1,780	1,624	1,630	1,519	1,105
Packaged fuel	80	77	69	65	47
Total	2,568	2,532	2,353	2,336	1,547
Europe:					
Austria	19	9	11	9	13
Belgium	1,469	1,446	1,701	2,006	2,008
Bulgaria [2]	250	250	250	255	255
Czechoslovakia: [2]					
Bituminous	440	450	455	455	455
Lignite	470	495	495	500	500
Denmark	86	97	91	94	[2] 165
Finland (capacity) [2]	88	88	88	88	88
France	7,671	7,422	7,392	8,673	9,100
Germany:					
East, lignite	50,376	51,698	56,218	56,879	58,863
West:					
Bituminous	5,783	6,647	7,621	8,498	8,624
Lignite	18,275	18,372	18,123	18,691	18,547
Hungary	532	538	755	[2] 690	[2] 710
Ireland	40	40	47	55	37
Italy, anthracite	----------	23	28	28	[2] 22
Netherlands:					
Bituminous	996	1,012	1,076	1,139	1,250
Lignite	93	90	94	86	101
Poland:					
Bituminous	725	745	770	714	[2] 740
Lignite	174	158	202	206	[2] 280
Portugal	91	100	106	112	[2] 99
Rumania [2]	285	285	285	285	300
Spain	1,283	1,226	1,303	1,431	[2] 1,510
Sweden	67	60	77	[2] 77	[2] 77
Switzerland [2]	110	110	110	110	110
U. S. S. R.[2]	9,300	9,400	9,400	9,400	9,400
United Kingdom	1,765	1,884	1,887	1,990	2,359
Yugoslavia:					
Bituminous	[2] 18	[2] 22	28	[2] 28	[2] 28
Lignite [2]	195	200	200	200	200
Total	100,600	102,900	108,800	112,700	115,800
Asia:					
Indonesia	37	37	37	25	[2] 25
Japan	2,281	2,724	2,905	[2] 2,975	[2] 3,085
Korea, Republic of	52	46	101	407	362
Pakistan [2]	13	13	13	13	13
Turkey	88	99	103	[2] 105	[2] 110
Vietnam	53	55	[2] 55	[2] 55	[2] 55
Total	2,524	2,974	3,214	3,580	3,650
Africa:					
Algeria	45	32	26	34	[2] 34
Morocco: Southern Zone	20	17	19	19	[2] 20
Tunisia	13	8	10	4	[2] 6
Total	78	57	55	57	60
Oceania:					
Australia	627	688	712	692	[2] 719
New Zealand	13	14	14	18	[2] 18
Total	640	702	726	710	737
World total[2]	106,400	109,200	115,100	119,400	121,800

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[1] Includes briquets made from coal, lignite, and peat and revisions of data published previously. Data do not add to totals shown owing to rounding.

[2] Estimated.

Peat

By Eugene T. Sheridan and Maxine M. Otero

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GENERAL SUMMARY

PEAT PRODUCTION in the United States increased 16 percent over 1956 and established a new record, reaching 316,217 net tons valued at $3,458,459. Although imports declined slightly, peat available for consumption increased 8 percent, and more peat was consumed in 1957 than in any prior year.

Demand for peat in the United States has increased greatly since World War II, and consumption in 1957 was more than two and one-half times greater than in 1947–49. Most of the peat consumed in 1957 went for general soil improvement, although small amounts were used in potting soils, in mixed fertilizers, for packing flowers for shipment, and for miscellaneous other purposes. Increased demand was due chiefly to expanding markets in agriculture and horticulture, caused to a great extent by the trend to suburban living in recent years, where much emphasis has been placed on the cultivation of lawns, shrubbery, and home gardens. No peat was used for fuel or energy purposes, as it cannot compete economically with other fuels that are amply available in the United States.

Peat in this report is classified into three general types—moss peat, reed-sedge peat, and peat humus. Moss peat, which constituted 14 percent of the 1957 production, consists chiefly of the poorly or moderately decomposed remains of several species of sphagnum, hypnum, and/or other mosses and is normally acid in reaction. Half of the total production was reed-sedge peat, which is formed principally from reeds, sedges, and/or other swamp or marsh plants. Reed-sedge peat is normally slightly acid, neutral, or slightly alkaline in reaction. Humus composed the remainder. Humus is any peat so decomposed that its biological identity is lost. It is fine-grained and is formed when deposits are exposed to periods of extended dryness.

Seventy-six companies in 20 States reported commercial production of peat in 1957. Michigan was first in production; Washington, second; and Florida, third. The combined production of these three States was half of the total production.

Most peat produced in the United States is sold in bulk. This is in contrast to imported peat, which is marketed almost entirely in packages, principally in bales. Improvements in packaging materials in recent years, however, have added greatly to development of the domestic peat industry, and one-fourth of the peat sold in 1957 was packaged—over three and one-half times the quantity packaged in 1956.

TABLE 1.—Salient statistics of the peat industry in the United States, 1947–49 (average) and 1954–57

	1947–49 (average)	1954	1955	1956	1957
Number of operations	45	85	82	75	76
Production net tons	131, 782	244, 163	273, 669	[1] 272, 972	316, 217
Value of production	$939, 518	$2, 257, 591	$2, 282, 865	[1] $2, 319, 957	$3, 458, 459
Average per net ton	$7. 13	$9. 25	$8. 34	[1] $8. 50	$10. 94
Imports [2] net tons	88, 462	240, 940	229, 310	247, 689	246, 759
Available for consumption [3] do	220, 244	485, 103	502, 979	[1] 520, 661	562, 976
World production do	50, 000, 000	[1] 58, 200, 000	[1] 66, 090, 000	[1] 58, 990, 000	70, 300, 000

[1] Revised figure.
[2] Compiled from records of the U. S. Department of Commerce.
[3] Production plus imports.

GOVERNMENT REGULATIONS

Since the chemical and physical properties of peat are so varied, no national standards have been established for the various types. The peat industry, however, is governed by trade-practice rules established by the Federal Trade Commission in 1950 to foster and promote fair competitive practices for protecting the industry and the public. Specifically, the rules were designed to prevent unfair or deceptive trade practices in marketing industry products and to prohibit specific kinds of misrepresentations and the deceptive use of trade or corporate names.

One significant section defines the requirements for labeling a product "peat" and also states the manner in which the terms "peat moss" and "moss peat" can be used. Peat is defined as "any partly decomposed vegetable matter which is accumulated under water or in a water-saturated environment through decomposition of mosses, sedges, reeds, tules, trees, or other plants." A product cannot be labeled "peat" unless 75 percent (by weight) of its composition, on a dry basis, is peat and the remainder consists of normally associated soil materials. Peat may not be labeled "moss peat" unless 75 percent of its composition is derived from sphagnum, hypnum, mnium, and/or other moss and the remainder consists of normally associated soil substances.

A product, however, may be labeled "peat moss," though not so qualified, if it fulfills the requirements for the term "peat" and states immediately the kind or kinds of peat of which the product is composed. Under this provision, peat formed predominantly from reeds and sedges may be labeled "peat moss—reed-sedge."

The Federal Supply Service, General Services Administration, has developed specifications for the use of all United States Government agencies that purchase peat. Federal Specification Q–P–166 (November 1957) divides peat into types and classes and lists general and detailed requirements for each type and class. It also provides other pertinent information, such as sampling, inspection, and testing procedures and packaging and marketing requirements. This specification is being revised, and Interim Federal Specification Q–P–00166b (October 30, 1957) has been issued for agencies to use in making current purchases.

SCOPE OF REPORT

This is the 24th continuous annual survey of the United States peat industry conducted by the Bureau of Mines since it resumed, in 1934, the survey formerly conducted by the Federal Geological Survey from 1908 to 1926. All statistical data, except where specified, were submitted voluntarily to the Bureau of Mines by United States peat producers.

Data were collected on the location of operations, size of deposits, types of equipment, quantities produced, types of preparation, quantity and value of bulk and packaged sales, major uses, and destination of shipments. No data are collected on stocks, since producers seldom stock peat. There is a difference, however, between the quantities produced and sold, as some producers excavate peat in one year and allow it to cure outdoors until the following year, when it is sold.

Complete coverage of the industry was attempted; a few small producers, however, probably remained uncanvassed, either because they operated intermittently in previous years or because they were new operators. However, the data obtained represent almost complete coverage of all commercial producers. Mailing lists are kept current by requesting companies to furnish the names and addresses of new producers in their areas, and individual State mineral and commodity production reports are checked periodically.

Data on sales of peat by uses include only peat produced in the United States, since imported peat is simply classified "Poultry and Stable grade" and "Fertilizer grade," and no information is available on its ultimate uses. Peat available for consumption in the United States is considered equal to production plus imports, since only a very small quantity of peat is exported.

All values on domestically produced peat are based upon producers' selling prices at the plant, exclusive of containers.

RESERVES

According to Federal Geological Survey field investigations in 1909 and 1922, peatlands in the United States contain an estimated 13.8 billion tons of air-dried peat. These reserves are almost wholly intact at present, for, since 1922, about 3.5 million tons or only 0.025 percent of the total has been recovered.

Peat occurs in 30 States, but about two-thirds of the total is in Minnesota and Wisconsin. Minnesota has the largest reserves, with about 6.8 billion tons, covering about one-tenth of the total land area of the State. Wisconsin has the second largest reserves, with approximately 1 million acres capable of yielding 2.5 billion tons. Florida and Michigan also have extensive peat deposits.

The major peat deposits in the United States are located, roughly, in two general regions—the Northern and the Atlantic Coast.

The Northern region contains the most extensive deposits and includes Minnesota, Wisconsin, and Michigan; the northern parts of Ohio, Iowa, Illinois, Indiana, and Pennsylvania; and New York, New Jersey, and New England. Peat in this region has generally formed in basins resulting from glacial action; and mosses, as well as reeds, sedges, and grasses, contributed heavily to its formation.

The Atlantic Coast region includes the southern part of Delaware; the eastern parts of Maryland, Virginia, North Carolina, South Carolina, and Georgia; and all of Florida. Peat in this area has formed largely in marshes and swamps from trees, reeds, sedges, and marsh grasses.

Peat also occurs in a narrow belt of land adjoining the Gulf coast, in six counties in California, and in the basins of several lakes and rivers in Oregon, Washington, and Idaho.

The Minnesota and Wisconsin deposits occur principally in wooded swamps and consist chiefly of a well-decomposed, black underlayer of fine-grained peat overlain with a slightly decomposed, fibrous, brown layer of built-up peat. Sphagnum mosses have contributed heavily to this top layer, and large quantities of sphagnum-moss peat are found in the muskeg and tamarack swamps of northern Minnesota and Wisconsin.

Michigan's northern peninsula contains extensive deposits of peat, similar in most respects to those in Minnesota and Wisconsin. There are also many smaller peat deposits in the southern peninsula that have formed largely in swamps and marshes from the remains of grasses and sedges.

Excluding New England, peat deposits in other States of the Northern region were, in most instances, formed in marshes, lakes, and ponds from the remains of certain mosses, shrubs, reeds, sedges, and grasses, and these peats are generally more decomposed that the peat found in northern Minnesota and Wisconsin. Some sphagnum-moss peat is also found in these States; but, in general, sphagnum was not a substantial contributor to peat formation in this area.

Peat deposits occur in all New England States; the largest are in Maine and Massachusetts. They are mostly of the filled-basin type and contain soft, well-decomposed peat covered with brown, fibrous, moss peat. In eastern Maine rather extensive areas of sphagnum-moss peat occur. Unlike most deposits of sphagnum peat in the United States, which have accumulated on top of peat formed from other types of vegetation, these deposits have resulted from a gradual buildup of the same plant materials on flat or gently sloping surfaces. Sphagnum mosses, heath shrubs, and associated conifers are the predominant plants in the area, and peat in these bogs is relatively homogeneous.

The largest deposits of peat in the Atlantic Coast region are in Virginia, North Carolina, and Florida. The most extensive deposits in Virginia occur in the Dismal Swamp area, which extends southward from Portsmouth into northern North Carolina. Much peat found in North Carolina is also in the Dismal Swamp. Peat deposits occur in almost all parts of Florida, which probably has more peat than any other State except Minnesota and Wisconsin.

TABLE 2.—Known original reserves of peat in the United States, estimated on an air-dried basis, by regions and States, in thousand net tons [1]

Region and State	Reserves
Northern region:	
Minnesota	6,835,000
Wisconsin	2,500,000
Michigan	1,000,000
Iowa	22,000
Illinois	10,000
Indiana	13,000
Ohio	50,000
Pennsylvania	1,000
New York	480,000
New Jersey	15,000
Maine	100,000
New Hampshire	1,000
Vermont	8,000
Massachusetts	12,000
Connecticut	2,000
Rhode Island	1,000
Total	11,050,000
Atlantic Coast region:	
Virginia and North Carolina	700,000
Florida	2,000,000
Other States [2]	2,000
Total	2,702,000
Other regions:	
Gulf Coast [3]	2,000
California	72,000
Oregon and Washington	1,000
Total	75,000
Total all regions	13,827,000

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[1] Geological Survey, Coal Resources of the United States (Progress Report): Circ. 293, Oct. 1. 1953, p. 38.

[2] Includes Delaware, Maryland, South Carolina, and Georgia.

[3] Exclusive of Florida.

PRODUCTION

Peat-production methods in the United States vary greatly, as no one method is suitable for all operations. Virtually all workings are mechanized to some extent, and equipment generally has been devised by individual operators to meet requirements. Usually, conventional types of excavating and earth-moving machinery are employed for excavating, whereas hammermills and modified grinding and pulverizing equipment are used for shredding. Only one producer reported that he excavated peat by hand.

Draglines are employed extensively for excavating peat and in 1957 were used by 40 of the 73 producers who reported on their equipment. Peat was also excavated by power shovels, clamshell buckets, dredges, bulldozers, front-end loaders, and several machines of original design. The most widely used equipment was the front-end loader, used at 49 operations. This machine was used primarily for moving and loading peat and, in a few instances, for excavating.

Seventy-six producing companies in 20 States reported commercial production of peat in 1957. Michigan was the largest producer, with one-fourth of the total, followed by Washington and Florida, each with 12 percent. California and Pennsylvania produced the next largest quantities; and their production, combined with that of Washington, Michigan, and Florida, represented about 70 percent of the total output.

Production in 1957 was higher than in 1956, principally because of increased production in Michigan and California. Increased production in California resulted directly from greater output by the same companies that operated in 1956. Michigan, however, had two more producing companies than in 1956, and the increased production was due largely to the output of these additional operations. Production in Ohio decreased 65 percent from 1956, chiefly because 1 company depleted its reserves and did not operate in 1957. Although ranking second in production, Washington, with 12 producing companies, had the largest number of operations. Several of these, however, had a total output of only a few hundred tons. Florida, with 9 producing companies, had the second largest number and was followed by Indiana and Ohio, with 8 producers each.

Fifty percent of the total production in 1957 was reed-sedge peat; 36 percent, humus; and 14 percent, moss peat. About one-sixth of the total output was raw peat, with no preparation other than having been air-dried. The remainder consisted of processed peat, prepared for use by cultivation, shredding, or kiln-drying. About 80 percent of all peat produced was shredded, but only 12 percent was cultivated. Cultivation is a process whereby the surface of a peat deposit is turned over at intervals for a period of time. This exposes the peat to air, causing gradual decomposition.

Figure 1 presents, graphically, domestic production, imports, and available supply of peat in the United States since 1940.

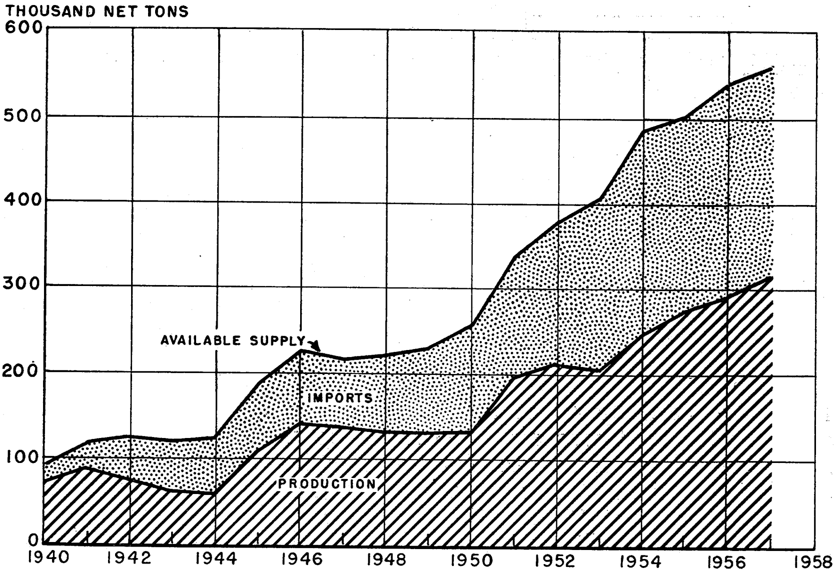

FIGURE 1.—Production, imports, and available supply of peat in the United States, 1940–57.

CONSUMPTION AND USES

More peat was available for consumption in the United States in 1957 than in any previous year. Both production and imports increased steadily during the past decade, and annual consumption in 1957 was about two and one-half times greater than in 1947–49.

Peat was distributed in 45 States and the District of Columbia in 1957, but about three-fourths of it was sold in bulk and consumed within the producing State. Packaged sales are increasing rapidly, however, and about three and one-half times more packaged peat was sold in 1957 than in 1956.

TABLE 3.—Peat produced in the United States, 1956–57, by States

State	1956			1957		
	Number of producers	Net tons	Value	Number of producers	Net tons	Value
California	5	18,918	$214,735	5	35,916	$424,362
Colorado	---------	---------	---------	2	3,559	(1)
Connecticut	3	[2] 3,190	[2] 12,512	3	2,004	11,268
Florida	11	58,496	203,034	9	37,844	194,937
Georgia	3	6,225	47,843	3	4,690	44,496
Idaho	---------	---------	---------	1	(1)	(1)
Illinois	3	14,451	157,573	4	11,480	106,321
Indiana	7	11,383	78,594	8	13,805	129,750
Iowa	2	27,375	(1)	2	(1)	(1)
Maine	2	(1)	(1)	2	3,770	175,173
Massachusetts	1	300	(1)	1	600	(1)
Michigan	3	31,111	474,899	5	80,271	1,406,195
Minnesota	1	100	(1)	1	1,300	(1)
New Hampshire	1	320	(1)	1	85	(1)
New Jersey	2	(1)	(1)	2	(1)	(1)
New York	3	2,900	23,244	1	(1)	(1)
Ohio	11	15,509	174,469	8	5,478	102,074
Pennsylvania	5	20,498	213,509	5	26,086	235,752
Washington	12	37,043	128,964	12	39,364	153,274
Wisconsin	---------	---------	---------	1	400	(1)
Undistributed	---------	25,153	590,581	---------	49,565	474,857
Total	75	[2] 272,972	[2] 2,319,957	76	316,217	3,458,459

[1] Included with "Undistributed" to avoid disclosing individual company figures.
[2] Revised figure.

TABLE 4.—Peat produced in the United States in 1957, by kinds, in net tons

Kind	Total		Raw	Prepared	Type of preparation		
	Quantity	Value			Cultivated	Shredded	Kiln-dried
Moss	45,622	$569,904	6,010	39,612	---------	35,170	4,442
Reed-sedge	157,156	2,210,787	3,785	153,371	27,225	153,286	---------
Humus	113,439	677,768	39,738	73,701	10,290	66,111	300
Total	316,217	3,458,459	49,533	266,684	37,515	[1] 254,567	4,742

[1] Includes 30,140 tons of cultivated peat, which was processed further by shredding.

As shown in table 6, the large gain in packaged sales in 1957 was due chiefly to increased sales in California and Michigan. Seventy-one percent of all packaged peat sold in 1957 came from Michigan, 14 percent from California, and the remainder from 7 other States. Michigan sold 11 times more packaged peat in 1957 than in 1956, and packaged sales in California increased two and one-half times. All peat produced in Maine in 1957 was packaged.

Whereas all peat produced in Washington and Florida was sold in bulk and all but a small quantity was consumed within these States, Michigan and Maine shipped the greater part of their output to other States. New York, Ohio, and Pennsylvania were the principal markets for Michigan peat, and Massachusetts, New York, and Ohio received most of the peat shipped from Maine.

Ninety-one percent of all peat sold in 1957 was used for general soil improvement. Although exact data are not available on specific end uses, most of this peat was consumed for constructing lawns, improving garden soils, and conditioning soils in which all types of plants and flowers were grown. Peat was also used widely in greenhouses and at nurseries to germinate seeds, to start cuttings, and to surface-mulch evergreen trees and shrubs. Peat benefits the soil by improving its physical condition (peat changes the structural characteristics and improves soil texture and water-holding properties). Although peat has a relatively high nitrogen content, it should not be used as a fertilizer, as most of the nitrogen is in the form of complex compounds that are slowly available to plants.

In former years substantial quantities of peat were kiln-dried and added to mixed fertilizers to prevent stickiness and caking. This practice now has been discontinued because of a process known as pelletizing, which eliminates the need for a conditioning agent. Although one producer reported that he sold peat in 1957 for use in mixed fertilizers, the peat was not kiln-dried and was added to condition the soil, rather than the fertilizer. Less than 1 percent of the total sales went for this purpose.

Nine producers sold 6 percent of the total peat marketed in 1957 for potting soils. The amount sold for this purpose has increased rapidly in the past few years and is now the second largest market for peat. About one-fourth of this amount was sold in bulk by producers to nurseries and greenhouses and to firms that packaged and resold it in retail stores. Generally, peat for potting soils is mixed with sand or loam and sold in small bags (1 to 25 pounds) in retail stores.

Small amounts of peat are used for a variety of other purposes. Seven producers sold 67 tons for use as an earthworm-culture medium, and 5 producers sold peat as a packing material for shipping flowers.

TABLE 5.—Peat sold in the United States in 1957, by uses

Use	In bulk			In packages			Total		
	Net tons	Value		Net tons	Value		Net tons	Value	
		Total	Average		Total	Average		Total	Average
Soil improvement	222,736	$1,551,265	$6.96	60,213	$1,477,512	$24.54	282,949	$3,028,777	$10.70
Potting soils	4,511	28,645	6.35	14,678	190,133	12.95	19,189	218,778	11.40
Earthworm-culture medium	65	488	7.51	2	90	45.00	67	578	8.63
Other [1]	5,526	54,501	9.86	2,748	63,568	23.13	8,274	118,069	14.27
Total	232,838	1,634,899	7.02	77,641	1,731,303	22.30	310,479	3,366,202	10.84

[1] Includes peat used in mixed fertilizers, as seed inoculant, for packing flowers, and for mushroom and tobacco-seed beds

Small quantities were also used for seed inoculants and for mushroom and tobacco-seed beds. About 3 percent of total sales went for these miscellaneous uses.

TABLE 6.—Peat sold in the United States, 1956–57, by States

State	1956					
	In bulk		Packaged		Total	
	Net tons	Value	Net tons	Value	Net tons	Value
California	14,522	$143,785	4,396	$70,950	18,918	$214,735
Colorado						
Connecticut	3,190	12,512			3,190	12,512
Florida	58,428	201,334	68	1,700	58,496	203,034
Georgia	4,734	40,506	180	2,093	4,914	42,599
Idaho						
Illinois	7,986	51,438	3,378	71,292	11,364	122,730
Indiana	11,164	75,722	59	1,500	11,223	77,222
Iowa	26,375	(1)	1,000	(1)	27,375	(1)
Maine			(1)	(1)	(1)	(1)
Massachusetts	300	(1)			300	(1)
Michigan	26,111	387,399	5,000	87,500	31,111	474,899
Minnesota	50	(1)			50	(1)
New Hampshire	320	(1)			320	(1)
New Jersey	(1)	(1)	(1)	(1)	(1)	(1)
New York	(1)	(1)	(1)	(1)	2,180	16,155
Ohio	17,436	163,628	1,282	37,900	18,718	201,528
Pennsylvania	17,216	150,055	1,199	45,748	18,415	195,803
Washington	34,650	113,850			34,650	113,850
Wisconsin						
Undistributed	21,822	406,697	5,511	199,639	25,153	590,181
Total	[2] 244,304	[2] 1,746,926	22,073	518,322	[2] 266,377	[2] 2,265,248

State	1957					
	In bulk		Packaged		Total	
	Net tons	Value	Net tons	Value	Net tons	Value
California	22,011	$161,765	11,000	$231,000	33,011	$392,765
Colorado	3,559	(1)			3,559	(1)
Connecticut	2,004	11,268			2,004	11,268
Florida	37,869	195,087			37,869	195,087
Georgia	4,421	39,654	269	4,842	4,690	44,496
Idaho	(1)	(1)			(1)	(1)
Illinois	8,229	43,166	1,680	33,600	9,909	76,766
Indiana	12,318	72,995	1,700	34,500	14,018	107,495
Iowa	(1)	(1)			(1)	(1)
Maine			(1)	(1)	(1)	(1)
Massachusetts	600	(1)			600	(1)
Michigan	25,386	268,073	54,885	1,138,122	80,271	1,406,195
Minnesota	1,300	(1)			1,300	(1)
New Hampshire	85	(1)			85	(1)
New Jersey	(1)	(1)	(1)	(1)	(1)	(1)
New York	(1)	(1)			(1)	(1)
Ohio	4,162	47,277	1,316	54,797	5,478	102,074
Pennsylvania	23,593	189,883	2,493	45,869	26,086	235,752
Washington	37,864	144,274			37,864	144,274
Wisconsin	400	(1)			400	(1)
Undistributed	49,037	461,457	4,298	188,573	53,335	650,030
Total	232,838	1,634,899	77,641	1,731,303	310,479	3,366,202

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[1] Included with "Undistributed" to avoid disclosing individual company figures.
[2] Revised figure.

TABLE 7.—Destination of peat shipments, 1956–57, in net tons

[Based upon reports from producers showing destination of peat used or sold]

State	1956	1957	State	1956	1957
Alabama	98	110			
Arizona	202	608	New Hampshire	875	383
Arkansas	37	40	New Jersey	11,866	13,749
California	18,816	32,645	New Mexico	148	415
Colorado	75	2,130	New York	18,069	20,528
Connecticut	4,250	3,150	North Carolina	935	1,205
Delaware	517	475	North Dakota	2	2
District of Columbia	1,971	2,193	Ohio	17,582	18,179
Florida	58,586	38,078	Oklahoma	415	708
Georgia	2,763	2,071	Pennsylvania	25,152	36,683
Idaho	26	248	Rhode Island	507	670
Illinois	10,426	9,202	South Carolina	698	943
Indiana	13,538	11,482	South Dakota	69	76
Iowa	27,482	24,376	Tennessee	916	855
Kansas	92	353	Texas	1,508	1,907
Kentucky	896	1,907	Utah	72	119
Louisiana	50	41	Virginia	1,789	1,732
Maine	521	322	Washington	34,819	38,050
Maryland	2,258	3,215	West Virginia	232	292
Massachusetts	1,527	4,332	Wisconsin	133	439
Michigan	4,426	32,075	Wyoming	85	93
Minnesota	50	1,300			
Missouri	1,197	1,712	Total	266,178	310,260
Montana	246	311	Exported	199	219
Nebraska	91	100			
Nevada	165	756	Grand total	[1] 266,377	310,479

[1] Revised figure.

VALUE AND PRICE

The total value of all peat produced in the United States in 1957 was 49 percent greater than in 1956 and nearly 4 times greater than in 1947–49. Although these increases were due chiefly to greater production, the value per ton also has increased steadily, and in 1957 the average value for each ton of peat produced was 29 percent greater than in 1956.

Table 8 lists average values per ton for production, by types, and average values per ton for sales, by uses. In 1957 reed-sedge peat had the highest average value, moss peat was second, and humus ranked third. Peat sold for "other uses" had the highest average sales value and peat sold for general soil improvement the lowest. These values are unrealistic, however, for the value assigned to any type generally depends upon the degree of preparation and processing that it has undergone and whether it is sold in bulk or packaged.

The average value per ton for packaged peat in 1957 was about three times greater than for peat sold in bulk. Average values for both bulk and packaged sales were lower in 1957 than in 1956; the average value per ton for total sales, however, increased 29 percent over 1956, principally because a much larger quantity of packaged peat was sold in 1957.

Although imports declined slightly in 1957, the total value of imports increased 7 percent over 1956, and imported peat had an average value of $45.74 per ton. This was more than four times the average value of $10.84 per ton for domestic peat. The values placed on imported and domestic peats cannot be compared equitably, however, for domestic-peat values are reported at the primary producing level, f. o. b. plant, whereas values on imported peat are established at the port of embarkation and are equivalent to prices paid by importers, less some transportation and miscellaneous other charges. Also, the greater part of the peat produced in the United States is sold in bulk, whereas most imported peat is baled or packaged. Actually, retail prices on foreign and domestic packaged peats of comparable quality are competitive.

TABLE 8.—Average value per ton of peat produced, by types, and sold, by uses, 1947–49 (average) and 1953–57

Year	Average value per ton produced			Average value per ton sold		
	[1] Moss	Reed-sedge	Humus	Soil improvement	Mixed fertilizers	Other uses
1947–49 (average)	$12.20	$7.64	$6.86	$6.33	$9.13	$7.43
1953	11.87	8.82	6.65	7.36	10.89	12.97
1954	10.22	13.38	7.23	8.69	9.93	35.49
1955	7.98	11.66	6.33	8.05	10.44	9.38
1956	12.55	11.32	[2] 5.46	[2] 8.32	8.51	10.57
1957	12.49	14.07	5.97	10.70	12.00	12.28

[1] Includes value of "Other types" of peat.
[2] Revised figure.

FOREIGN TRADE [1]

Peat imports declined slightly in 1957 but were still nearly three times greater than average imports for 1947–49. Canada and West Germany were the principal exporters of peat to the United States, and supplied 48 and 45 percent, respectively, of the total imports.

All imported peat was of the "moss-peat" type and was classified by the Bureau of the Census into two grades: (1) Fertilizer grade and (2) Poultry and Stable grade. Ninety-six percent of the imported peat was Fertilizer grade, which entered the United States duty free. A duty of $0.25 per long ton was levied on all imported peat classified as Poultry and Stable grade.

A large part of Canada's peat production was exported to the United States, chiefly as Fertilizer-grade peat. The greater part of this peat was produced in British Columbia and entered the United States through the Washington customs district. Substantial amounts of Canadian peat also entered the United States through the Michigan, Buffalo, and Vermont customs districts. Most Canadian peat is pressed into bales covered with burlap or heavy paper and weigh 100 to 150 pounds. Some peat is also packaged in heavy fiberboard containers that hold approximately 100 pounds. Canadian peat is generally produced in three grades: (1) Coarse, for use as stable litter, (2) medium, for poultry and small animal litter, and (3) fine, for soil conditioning, packing, and insulation. Approximately the same quantity of Canadian peat was imported in 1957 as in 1956.

German peat is shipped to the United States in bales and packages, and about 60 percent of the German imports enter the United States through the New York, Philadelphia, and Maryland customs districts. German imports decreased slightly in 1957.

Little, if any, peat is exported from the United States.

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[1] Figures on imports compiled by Mae B. Price and Elsie D. Jackson, Division of Foreign Activities, Bureau of Mines, from records of the Bureau of the Census, U. S. Department of Commerce.

TABLE 9.—Peat moss imported for consumption in the United States, 1955–57, by kinds and by countries

[Bureau of the Census]

Country	Poultry and Stable grade		Fertilizer grade		Total	
	Net tons	Value	Net tons	Value	Net tons	Value
	1955					
North America: Canada	6,661	$419,745	97,323	$4,841,882	103,984	$5,261,627
Europe:						
Denmark			280	13,488	280	13,488
Finland			50	1,372	50	1,372
Germany, West	4,882	154,210	112,873	3,530,749	117,755	3,684,959
Ireland			166	5,991	166	5,991
Netherlands	111	4,348	6,923	288,665	7,034	293,013
Sweden			9	381	9	381
United Kingdom	32	989			32	989
Total	5,025	159,547	120,301	3,840,646	125,326	4,000,193
Grand total	11,686	[1] 579,292	217,624	[1] 8,682,528	229,310	[1] 9,261,820
	1956					
North America:						
Canada	7,334	513,525	111,761	5,576,429	119,095	6,089,954
Mexico	136	11,951			136	11,951
Total	7,470	525,476	111,761	5,576,429	119,231	6,101,905
Europe:						
Denmark			2,426	97,184	2,426	97,184
Finland			93	3,995	93	3,995
Germany, West	6,167	203,821	111,844	3,798,795	118,011	4,002,616
Netherlands	226	9,923	5,476	209,041	5,702	218,964
Poland and Danzig			530	14,504	530	14,504
Sweden	414	18,889	1,109	60,473	1,523	79,362
United Kingdom			155	4,023	155	4,023
Total	6,807	232,633	121,633	4,188,015	128,440	4,420,648
Asia: Japan	18	7,886			18	7,886
Grand total	14,295	[1] 765,995	233,394	[1] 9,764,444	247,689	[1] 10,530,439
	1957					
North America;						
Canada	6,060	432,749	111,927	6,242,104	117,987	6,674,853
Mexico	40	2,069			40	2,069
Total	6,100	434,818	111,927	6,242,104	118,027	6,676,922
Europe:						
Belgium-Luxembourg			60	1,956	60	1,956
Czechoslovakia			43	1,120	43	1,120
Denmark			5,120	239,277	5,120	239,277
Finalnd			74	3,420	74	3,420
France			327	19,843	327	19,843
Germany, West	4,227	149,912	107,322	3,752,576	111,549	3,902,488
Ireland			1,007	38,763	1,007	38,763
Netherlands	62	2,538	7,054	263,472	7,116	266,010
Poland and Danzig			1,869	60,500	1,869	60,500
Sweden			644	36,746	644	36,746
United Kingdom			865	38,526	865	38,526
Total	4,289	152,450	124,385	4,456,199	128,674	4,608,649
Asia: Japan			58	1,918	58	1,918
Grand total	10,389	587,268	236,370	10,700,221	246,759	11,287,489

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[1] Owing to changes in tabulating procedures by the Bureau of the Census data known to be not comparable with earlier years.

TABLE 10.—Peat moss imported for consumption in the United States in 1957, by kinds and by customs districts

[Bureau of the Census]

Customs district	Poultry and Stable grade		Fertilizer grade		Total	
	Net tons	Value	Net tons	Value	Net tons	Value
Buffalo	100	$3,493	15,284	$650,869	15,384	$654,362
Connecticut	--------	--------	20	1,358	20	1,358
Dakota	2,082	153,645	3,610	219,377	5,692	373,022
Duluth and Superior	209	12,040	1,305	54,343	1,514	66,383
Florida	230	7,335	6,058	185,705	6,288	193,040
Galveston	80	2,591	3,245	102,767	3,325	105,358
Georgia	--------	--------	1,027	30,006	1,027	30,006
Hawaii	--------	--------	7	403	7	403
Indiana	--------	--------	451	8,156	451	8,156
Laredo	--------	--------	137	4,321	137	4,321
Los Angeles	21	773	4,351	153,021	4,372	153,794
Maine and New Hampshire	41	1,470	1,227	75,386	1,268	76,856
Maryland	345	12,993	13,993	526,809	14,338	539,802
Massachusetts	11	316	7,174	232,959	7,185	233,275
Michigan	928	44,775	18,438	837,808	19,366	882,583
Mobile	101	3,153	6,194	182,678	6,295	185,831
New Orleans	1,801	68,368	8,400	291,944	10,201	360,312
New York	654	21,010	46,815	1,861,416	47,469	1,882,426
North Carolina	--------	--------	264	14,189	264	14,189
Oregon	--------	--------	211	9,802	211	9,802
Philadelphia	506	17,475	15,747	485,097	16,253	502,572
Puerto Rico	41	1,844	78	4,935	119	6,779
Sabine	--------	--------	50	1,510	50	1,510
St. Lawrence	64	2,136	8,009	315,965	8,073	318,101
San Diego	--------	--------	45	1,404	45	1,404
San Francisco	35	787	1,028	36,684	1,063	37,471
South Carolina	--------	--------	795	24,380	795	24,380
Vermont	159	7,724	11,422	488,819	11,581	496,543
Virginia	494	17,372	7,111	239,066	7,605	256,438
Washington	2,487	207,968	53,874	3,659,044	56,361	3,867,012
Total	10,389	587,268	236,370	10,700,221	246,759	11,287,489

TECHNOLOGY

Technologic progress in peat utilization has been greatest in Europe, where large quantities are consumed for energy purposes. Because of inadequate supplies of coal and other fuels, several countries (particularly the U. S. S. R., Ireland, Germany, and Sweden) have developed their peat resources, and today large quantities are used for generating electric power, for industrial and domestic heating, and for manufacturing gas and chemicals.

Extensive development work on peat in the U. S. S. R. has resulted in a highly integrated industry that supplies an estimated 10 percent of the total fuel required for generating electric power in the Soviet Union. Because of the magnitude of operations in the U. S. S. R. (approximately 85 percent of estimated world production in 1957—see World Review, table 11), the entire recovery process has been mechanized; and huge, intricate machines have been developed to remove trees and stumps, construct drainage ditches, and excavate, process, and load peat into railroad cars for shipment to power stations. A five-man mission from the United States visited peat operations in the U. S. S. R. in 1957.

A recent Soviet report [2] describes an instrument that rapidly determines the moisture content of peat. It consists of a grid of heating wires with a series of 200 thermocouples arranged at right angles to them. The heating wires are in circuit with a battery and switch, and the thermocouples are in circuit with a condenser and a galvanometer. When the heating wires are switched on, the temperature rise recorded by the galvanometer in the thermocouple circuit is inversely proportional to the moisture content of the surrounding medium. There are two types of instruments. In one the grid unit is thrust into a mass of peat; in the other a sample of peat is squeezed against both sides of the grid by pistons in cylinders.

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[2] Yershov, V. N., and Yershova, N. M., [Rapid Method for Determining Moisture in Peat]: Torf. Prom. (Peat Ind., Moscow), 1957, (2), pp. 20–22; Fuel Abs. 2061, August 1957.

Another Soviet report[3] describes two methods for rapidly analyzing peat for ash content. One method consists of calcining a 6- to 6.5-gm. sample of peat in a steel-alloy pan, 85 to 100 mm. in diameter, in a muffle furnace at 800°–900° C. The other consists of heating 2- or 3-gm. samples of peat in porcelain boats on an electric hot plate and subsequently calcining with a heat-radiating lamp. The methods are intended as quick checks for peat producers and users and give results within 0.5 percent of the standard method.

In the United States, however, developments in peat technology have lagged, because peat has not been able to compete economically with other fuels; hence little effort has been made in the past to utilize our resources for industrial purposes. In recent years, however, the State of Minnesota, through its agency, The Iron Range Resources Rehabilitation Commission, has been actively conducting studies to determine methods and processes for utilizing the State's vast peat resources. Although these studies are designed to develop basic knowledge on peat, their ultimate objective is eventual utilization of Minnesota peat for industrial applications.

WORLD REVIEW[4]

The estimated world production of peat in 1957 exceeded 70 million tons. The U. S. S. R., Ireland, and West Germany were the chief producers, and their combined production was 94 percent of the world total.

The U. S. S. R., with 85 percent of the total production, was the major peat-producing country. Peat development in Russia began in 1920, and the industry is now highly mechanized, with production of nearly 60 million tons in 1957. Peat reserves in the U. S. S. R. are estimated at 160 billion tons of air-dried peat, or approximately 60 percent of the known world reserves.

Peat has many uses in the U. S. S. R., but in 1957, 78 percent of the total production was consumed in generating electric power. Large quantities also are used for soil improvement and for industrial and domestic heating.

Ireland ranked second in peat production, with 7 percent of the total. A large part of Ireland's total output in 1957 was consumed in generating electric power, and peat-fired power stations provided about 30 percent of the total electric-power output. Three stations are now in operation, and 4 others are planned, 2 of which are under construction; the 3 operating stations have a combined annual production capacity of nearly 300 million kw.-hr. Large quantities of peat also are consumed in Ireland for domestic heating, and 4 percent of the total production was used in agriculture.

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[3] Shchukin, U. M., and Storchak, E. E., [Rapid Method for Analysis of Peat for Ash]: Torf. Prom. (Peat Ind., Moscow), 1953, (10), pp. 11-14; Fuel Abs. vol. 21, No. 3, Abs. 2918, March 1957.

[4] Figures on world production compiled by Pearl J. Thompson, Division of Foreign Activities, Bureau of Mines.

West Germany produced about 1½ million tons of peat in 1957; approximately half was consumed for fuel and the remainder used in agriculture.

Denmark, Poland, East Germany, and the Netherlands all produced substantial quantities of peat; but, because of the tremendous quantities produced in the U. S. S. R., their combined output was only 4 percent of the total. The United States supplied only 0.4 percent of all peat produced in 1957.

TABLE 11.—World production of peat, 1953–57, by countries, in thousand net tons [1]

Country	1953	1954	1955	1956	1957
Austria, fuel [2]	55	55	45	45	45
Canada, agricultural use [3]	82	99	118	128	132
Denmark	633	601	785	778	809
Finland:					
Agricultural use	4	[2] 9	[2] 9	[2] 19	[2] 19
Fuel	216	165	176	158	208
France:					
Agricultural use	25	47	33	[2] 33	[2] 33
Fuel		4	2	[2] 2	[2] 2
Germany:					
East [2]	550	550	550	550	550
West:					
Agricultural use	485	480	492	659	780
Fuel	992	1,041	1,153	1,005	808
Hungary [2]	55	60	65	65	65
Ireland:					
Agricultural use	6	9	10	9	203
Fuel	4,255	3,025	3,937	4,006	4,378
Israel, agricultural use	----------	29	43	42	22
Japan [2]	55	65	75	75	80
Korea, Republic of	83	[2] 275	448	[2] 450	269
Netherlands	499	[2] 500	[2] 500	[2] 500	[2] 500
Norway:					
Agricultural use	23	23	31	29	[2] 150
Fuel	279	261	263	263	[2] 260
Poland	[2] 660	[2] 660	718	729	[2] 730
Sweden:					
Agricultural use	88	71	71	82	[2] 80
Fuel	265	231	287	275	[2] 275
U. S. S. R.	42,550	49,700	56,000	48,800	[2] 59,600
United States, agricultural use	204	244	274	292	316
World total [2] [4]	52,100	58,200	66,090	58,990	70,300

[1] Includes revisions of data published previously. Data do not add to totals shown because of rounding.
[2] Estimated.
[3] In addition, Canada produced a negligible amount of peat fuel.
[4] Iceland, Italy, and Spain produced a negligible amount of peat fuel.

B. Petroleum and Related Products

Petroleum Asphalt

By Albert T. Coumbe and Patricia O. Feik

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GENERAL SUMMARY

THE PRODUCTION of petroleum asphalt declined 6 percent in 1957. Imports nearly doubled, rising 91 percent; exports increased 20 percent. The year-end stocks gained 14 percent during the year. The apparent domestic consumption (production, plus imports, less exports, and plus or minus the change in stocks) was 2 percent lower in 1957

The production of road oil declined 10 percent in 1957, and the apparent domestic consumption declined 12 percent. Year-end stocks of road oil increased 17 percent during the year.

SCOPE OF REPORT

Production and stock statistics for asphalt and road oil were obtained from the monthly questionnaires covering all products sent to petroleum refineries.

An annual schedule for reporting an end-use breakdown of sales by principal uses of petroleum asphalt and road oil in 1957 was sent to all known producers and asphalt-emulsion manufacturers. Estimates of the sales of nonreporting producers were based on their monthly asphalt and road-oil production.

SALES

The total sales of asphalt and road oil, as reported in the annual survey, are not strictly comparable with the apparent domestic consumption shown in tables 2 and 3, because these annual figures are reported by the sales departments of the oil companies. Apparent domestic consumption is calculated from the production and stocks reported by the petroleum refineries and data on imports and exports released by the Bureau of the Census, United State Department of Commerce. Furthermore, some water or other liquids, added to make emulsified asphalts and cutbacks can increase the volume to some extent. Also heavy fuel oil is sometimes delivered as road oil, so that sales total can be above the monthly demand figures.

TABLE 1.—Statistical summary of petroleum asphalt and road oil, 1953–57

(Thousand short tons) [1]

	1953	1954	1955	1956	1957
Petroleum asphalt:					
Production	13, 165	13, 620	15, 113	16, 479	15, 579
Imports [2] (including natural)	455	617	605	656	1, 256
Exports [3]	311	340	285	275	329
Stocks (end of period)	1, 330	1. 305	1, 413	1, 664	1, 902
Apparent domestic consumption [4]	13, 128	13, 923	15, 325	16, 609	16, 268
Petroleum-asphalt sales:					
Paving	9, 158	9, 968	10, 766	12, 208	11, 934
Roofing	3, 459	3, 250	3, 502	3, 411	2, 819
All other	1, 425	1, 463	1, 412	1, 638	1, 620
Total	14, 042	14, 681	15, 680	17, 257	16, 373
Road oil:					
Production	1, 199	1, 312	1, 542	1, 459	1, 311
Stocks (end of period)	79	79	102	91	107
Apparent domestic consumption [5]	1, 202	1, 312	1, 519	1, 470	1, 295
Road-oil sales	1, 330	1, 346	1, 460	1, 493	1, 306

[1] Converted from barrels to short tons (5.5 barrels=1 short ton).
[2] Imports into continental United States only.
[3] Includes shipments to noncontiguous Territories.
[4] Production, plus imports, less exports, plus or minus change in stocks.
[5] Production, plus or minus change in stocks.

TABLE 2.—Salient statistics of petroleum asphalt in the United States, 1956–57, by months and districts

(Thousand short tons) [1]

	Production		Imports [2] (including natural)		Exports [3]		Stocks (end of period)		Apparent domestic consumption [4]	
	1956	1957 [5]	1956 [6]	1957 [5]	1956 [6]	1957 [5]	1956	1957 [5]	1956 [6]	1957 [5]
Month:										
January	806	712	35	106	13	19	1, 646	1, 887	595	576
February	861	711	21	14	47	19	1, 929	2, 057	552	535
March	1, 081	999	43	54	27	22	2, 194	2, 359	833	730
April	1, 206	1, 189	43	130	25	27	2, 398	2, 656	1, 021	995
May	1, 467	1, 510	51	79	18	19	2, 355	2, 756	1, 544	1, 469
June	1, 715	1, 639	41	100	9	30	2, 077	2, 625	2, 025	1, 841
July	1, 823	1, 780	66	94	46	39	1, 752	2, 093	2, 168	2, 367
August	1, 922	1, 910	95	104	16	47	1, 396	1, 813	2, 356	2, 247
September	1, 783	1, 694	87	118	14	23	1, 242	1, 561	2, 009	2, 041
October	1. 728	1, 470	75	146	21	37	1, 200	1, 430	1, 823	1, 711
November	1, 195	1, 110	43	132	16	16	1, 410	1, 636	1, 012	1, 020
December	892	855	56	179	23	31	1, 664	1, 902	671	736
Total	16, 479	15, 579	656	1, 256	275	329	1, 664	1, 902	16, 609	16, 268
District:										
East Coast	3, 696	3, 477	(7)	(7)	(7)	(7)	312	340	(7)	(7)
Appalachian	566	557					46	55		
Indiana, Illinois, Kentucky, etc	2, 914	2, 879					311	377		
Minnesota, Wisconsin, North Dakota	167	170					16	33		
Oklahoma, Kansas, etc	1, 893	1, 571					285	285		
Texas Inland	820	820					82	76		
Texas Gulf Coast	1, 074	1, 106					89	84		
Louisiana Gulf Coast	966	836					99	111		
Arkansas, Louisiana Inland, etc	893	902					82	105		
Rocky Mountain	1, 157	1, 108					141	194		
West Coast	2, 333	2, 153					201	242		
Total	16, 479	15, 579	656	1, 256	275	329	1, 664	1, 902	16, 609	16, 268

[1] Converted from barrels to short tons (5.5 barrels=1 short ton). [2] Imports into continental United States only. [3] Includes shipments to noncontiguous territories. [4] Production, plus imports, less exports, plus or minus change in stocks. [5] Preliminary figures. [6] Revised. [7] Figures not available.

TABLE 3.—Salient statistics of road oil in the United States, 1956–57, by months and districts

(Short tons)[1]

Month and district	Production		Stocks (end of period)		Apparent domestic consumption [2]	
	1956	1957 [3]	1956	1957 [3]	1956	1957 [3]
Month:						
January	29,818	28,545	79,818	82,909	51,818	36,727
February	38,364	39,818	86,727	94,182	31,455	28,545
March	74,363	98,909	121,636	160,000	39,455	33,091
April	108,000	83,636	166,000	197,273	63,636	46,363
May	157,818	126,909	195,636	223,273	128,182	100,909
June	230,909	190,727	191,818	222,909	234,727	191,091
July	262,364	213,455	187,636	174,000	266,545	262,364
August	222,182	252,364	129,455	153,091	280,364	273,273
September	180,000	121,455	129,273	123,091	180,182	151,455
October	75,273	71,818	104,545	109,091	100,000	85,818
November	41,455	44,182	92,182	108,000	53,818	45,273
December	38,909	38,909	91,091	106,727	40,000	40,182
Total	1,459,455	1,310,727	91,091	106,727	1,470,182	1,295,091
District:						
East Coast	23,818	7,273	909	1,091	(4)	(4)
Appalachian	8,726	10,182	545	364		
Indiana, Illinois, Kentucky, etc	345,272	304,727	21,273	18,909		
Minnesota, Wisconsin, North Dakota	----------	15,091	----------	----------		
Oklahoma, Kansas, etc	232,364	232,182	8,182	21,272		
Texas Inland	----------	727	----------	----------		
Texas Gulf Coast	1,638	4,182	182	----------		
Louisiana Gulf Coast	182	364	182	182		
Arkansas, Louisiana Inland, etc	182	2,363	182	182		
Rocky Mountain	284,728	272,545	17,091	28,545		
West Coast	562,545	461,091	42,545	36,182		
Total	1,459,455	1,310,727	91,091	106,727	1,470,182	1,295,091

[1] Converted from barrels to short tons (5.5 barrels=1 short ton).
[2] Production, plus or minus change in stocks.
[3] Preliminary figures.
[4] Figures not available.

Sales of asphalt and asphaltic products (16.4 million short tons) were 5 percent below the 1956 total. Asphalt for paving purposes declined 2 percent in 1957 (notwithstanding the increased use of asphalt in public road construction) and made up 73 percent of all requirements, compared with 71 percent in 1956. Petroleum asphalt, including cements, cutback asphalt, and emulsfied products, totaled 11.9 million short tons sold for paving purposes, such as public highways, roads on private property, sidewalks, automobile parking areas, and airfield runways.

The comparable quantity of portland cement sold is not available. However, data of the Bureau of Public Roads, United States Department of Commerce, indicate that about 10.2 million short tons of asphaltic products and about 9.3 million short tons of portland cement were used for paving and maintaining public highways in 1957, and that an additional 3.7 million short tons of portland cement was used for bridges, culverts, and other structures on public highways in 1957.

New-building construction continued to decline in 1957, as in 1956, according to the United States Department of Commerce; consequently, the asphalt and asphalt products reported as sold for roofing purposes dropped about 17 percent—from 3.4 million short tons in 1956 to 2.8 million in 1957. Sales of asphalt for roofing material

TABLE 4.—Sales of petroleum-asphalt paving products in the United States, 1956–57, by districts and States

(Short tons)

District [1] and State	Asphalt cements		Cutback asphalts		Emulsified asphalts		Total	
	1956	1957	1956	1957	1956	1957	1956	1957
District 1:								
Connecticut	68, 161	176, 215	45, 264	16, 085	3, 092	6, 181	116, 517	198, 481
Delaware	17, 313	17, 073	15, 650	26, 757	843	575	33, 806	44, 405
Florida	280, 219	304. 021	139, 260	141, 045	23, 138	31, 742	442, 617	476, 808
Georgia	188, 456	161, 867	73, 822	76, 369	4, 921	18, 281	267, 199	256, 517
Maine	27, 562	32, 318	49, 654	53, 681	6, 607	9, 574	83, 823	95, 573
Maryland and District of Columbia	155, 092	152, 603	93, 643	84, 216	21, 671	23, 725	270, 406	260, 544
Massachusetts	284, 684	235, 756	74, 937	84, 838	1, 861	452	361, 482	321, 046
New Hampshire	26, 766	19, 044	26, 569	55, 862	154	100	53, 489	75, 006
New Jersey	184, 585	217, 963	87, 777	100, 092	4, 127	12, 635	276, 489	330, 690
New York	409, 624	427. 304	207, 049	226, 998	107, 202	89, 975	723, 875	744, 277
North Carolina	176, 448	200, 118	114, 402	89, 491	28, 892	30, 520	319, 742	320, 129
Pennsylvania	335, 504	360, 451	162, 026	154, 147	45, 951	40, 812	543, 481	555, 410
Rhode Island	39, 933	47, 554	28, 819	36, 770	618	27	69, 370	84, 351
South Carolina	77, 681	74, 720	38, 979	42, 246	100	5	116, 760	116, 971
Vermont	8, 782	10, 285	18, 689	24, 635	28	214	27, 499	35, 134
Virginia	134, 421	149, 278	129. 364	126, 110	3, 766	4, 629	267, 551	280, 017
West Virginia	58, 358	59, 919	31, 989	28, 994	3, 438	876	93, 785	89, 789
Total	2, 473, 589	2, 646, 489	1, 337, 893	1, 368, 336	256, 409	270, 323	4, 067, 891	4, 285, 148
District 2:								
Illinois	213, 382	294, 602	112, 339	119, 203	8, 784	7, 796	334, 505	421, 601
Indiana	127, 782	95, 699	166, 493	117, 938	108, 103	67, 831	402, 378	281, 468
Iowa	107, 500	136, 240	100, 682	71, 571	35, 780	37, 742	243, 962	245, 553
Kansas	144, 933	81, 792	188, 500	180, 274	2, 101	122	335, 534	262, 188
Kentucky	88, 502	79, 175	77, 388	92, 527	20, 032	17, 494	185, 922	189, 196
Michigan	152, 044	174, 930	121, 574	84, 279	33, 292	52, 853	306, 910	312, 062
Minnesota	134, 473	124, 827	210, 520	183, 357	7, 467	13, 559	352, 460	321, 743
Missouri	111, 427	89, 315	130, 797	127, 929	5, 461	2, 545	247, 685	219, 789
Nebraska	31, 767	28, 212	72, 402	31, 038	698	274	104, 867	59, 524
North Dakota	100, 396	94, 640	55, 315	47, 111	4, 252	17, 139	159, 963	158, 890
Ohio	321, 208	390, 234	306, 090	295, 173	116, 546	111, 495	743, 844	796, 902
Oklahoma	102, 906	97, 107	163, 090	119, 840	3, 796	5, 097	269, 792	222, 044
South Dakota	71. 818	67, 163	40, 327	35, 035	97	885	112, 242	103, 083
Tennessee	191, 244	161, 459	107, 948	85, 241	16, 249	16, 103	315, 441	262, 803
Wisconsin	116, 301	125. 418	94, 818	95, 398	9, 862	9, 573	220, 981	230, 389
Total	2, 015, 683	2, 040, 813	1, 948, 283	1, 685, 914	372, 520	360, 508	4, 336, 486	4, 087, 235
District 3:								
Alabama	171, 597	154, 310	69, 943	59, 752	38, 858	36, 449	280, 398	250, 511
Arkansas	58, 047	39, 647	66, 305	12, 632	11, 701	8, 869	136, 053	61, 148
Louisiana	184, 147	112, 108	44, 710	33, 122	15, 908	17, 398	244, 765	162, 628
Mississippi	70, 759	82, 666	43, 959	38, 860	17, 563	17, 095	132, 281	138, 621
New Mexico	78, 878	92, 484	65, 112	53, 129	2, 810	4, 342	146, 800	149, 955
Texas	473, 562	459, 569	173, 627	137, 092	29, 526	15, 837	676, 715	612, 498
Total	1, 036, 990	940, 784	463, 656	334, 587	116, 366	99, 990	1, 617, 012	1, 375, 361
District 4:								
Colorado	106, 129	89, 269	62, 480	40, 260	275	1, 323	168, 884	130, 852
Idaho	17, 567	12, 066	39, 915	31, 881	2, 499	1, 979	59, 981	45, 926
Montana	22, 750	34, 585	46, 938	38, 378	6, 877	7, 062	76, 565	80, 025
Utah	71, 164	54, 168	41, 809	54, 683	--------	1	112, 973	108, 852
Wyoming	31, 775	81, 387	36, 682	56, 228	19	--------	68, 476	137, 615
Total	249, 385	271, 475	227, 824	221, 430	9, 670	10, 365	486, 879	503, 270
District 5:								
Arizona	49, 110	40, 183	41, 340	14, 961	11, 186	10, 393	101, 636	65, 537
California	871, 806	927. 571	110, 726	116, 754	119, 291	129, 056	1, 101, 823	1, 173, 381
Nevada	16, 816	11, 189	9, 228	10, 568	3, 116	1, 354	29, 160	23. 111
Oregon	158, 541	169, 910	40, 896	43, 344	4, 606	5, 157	204, 043	218, 411
Washington	137, 802	103, 917	121, 628	97, 675	3, 495	1, 468	262, 925	203, 060
Total	1, 234, 075	1, 252, 770	323, 818	283, 302	141, 694	147, 428	1, 699, 587	1, 683, 500
Total United States	7, 009, 722	7, 152, 331	4, 301, 474	3, 893, 569	896, 659	888, 614	12, 207, 855	11, 934, 514

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[1] States are grouped according to petroleum-marketing districts rather than conventional geographic regions.

TABLE 5.—Sales of petroleum-asphalt roofing products in the United States, 1956–57, by districts and States

(Short tons)

District [1] and State	Asphalt cements and fluxes		Emulsified asphalts		Total	
	1956	1957	1956	1957	1956	1957
District 1:						
Connecticut	12,880	15,976	19	58	12,899	16,034
Delaware	20,546	6,495	10	43	20,556	6,538
Florida	122,223	88,947			122,223	88,947
Georgia	58,469	93,036	17	7	58,486	93,043
Maine	350	38			350	38
Maryland and District of Columbia	55,681	47,837	223	302	55,904	48,139
Massachusetts	76,830	48,350	74	37	76,904	48,387
New Hampshire	536	405	8	1	544	406
New Jersey	355,419	292,659	120	78	355,539	292,737
New York	85,199	52,740	125	176	85,324	52,916
North Carolina	53,160	30,815	1		53,161	30,815
Pennsylvania	139,786	114,174	127	154	139,913	114,328
Rhode Island	65,391	34,279	3		65,394	34,279
South Carolina	31,292	28,510			31,292	28,510
Vermont	204	165	3	3	207	168
Virginia	5,006	4,725	7	18	5,013	4,743
West Virginia	20,879	12,617			20,879	12,617
Total	1,103,851	871,768	737	877	1,104,588	872,645
District 2:						
Illinois	538,683	523,376	32	108	538,715	523,484
Indiana	82,998	56,117	33	72	83,031	56,189
Iowa	7,056	5,790	3	11	7,059	5,801
Kansas	10,527	9,113			10,527	9,113
Kentucky	2,308	2,370	14	11	2,322	2,381
Michigan	65,592	42,305	55	124	65,647	42,429
Minnesota	87,233	105,775	2	22	87,235	105,797
Missouri	158,010	124,163		1	158,010	124,164
Nebraska	5,296	4,279			5,296	4,279
North Dakota	1,547	1,414			1,547	1,414
Ohio	87,824	49,749	2,411	2,628	90,235	52,377
Oklahoma	3,449	12,159			3,449	12,159
South Dakota	1,883	1,012			1,883	1,012
Tennessee	48,428	36,224			48,428	36,224
Wisconsin	9,026	6,445	19	80	9,045	6,525
Total	1,109,860	980,291	2,569	3,057	1,112,429	983,348
District 3:						
Alabama	101,750	111,809	13	701	101,763	112,510
Arkansas	41,252	32,753	13,119	13,152	54,371	45,905
Louisiana	169,408	104,437	2	11,792	169,410	116,229
Mississippi	9,674	15,903	2		9,676	15,903
New Mexico	15,679	8,667			15,679	8,667
Texas	213,371	84,064			213,371	84,064
Total	551,134	357,633	13,136	25,645	564,270	383,278
District 4:						
Colorado	24,045	27,003	1		24,046	27,003
Idaho	2,621	3,545			2,621	3,545
Montana	6,077	2,757			6,077	2,757
Utah	5,026	5,586			5,026	5,586
Wyoming	2,000	2,388			2,000	2,388
Total	39,769	41,279	1		39,770	41,279
District 5:						
Arizona	225	4			225	4
California	441,972	433,290	76	124	442,048	433,414
Nevada	922	280			922	280
Oregon	112,967	75,838	4	6	112,971	75,844
Washington	33,581	28,524	10	10	33,591	28,534
Total	589,667	537,936	90	140	589,757	538,076
Total United States	3,394,281	2,788,907	16,533	29,719	3,410,814	2,818,626

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[1] States are grouped according to petroleum-marketing districts rather than conventional geographic regions.

TABLE 6.—Sales of all other petroleum-asphalt products in the United States, 1956–57, by districts and States

(Short tons)

District [1] and State	Asphalt cements and fluxes		Emulsified asphalts		Total	
	1956	1957	1956	1957	1956	1957
District 1:						
Connecticut	15,034	11,536	368	267	15,402	11,803
Delaware	651	357	7	28	658	385
Florida	41,787	50,162	2,027	1,479	43,814	51,641
Georgia	46,057	42,606	873	289	46,930	42,895
Maine	4,574	4,049	985	90	5,559	4,139
Maryland and District of Columbia	24,322	21,865	1,561	1,554	25,883	23,419
Massachusetts	28,717	27,753	962	1,826	29,679	29,579
New Hampshire	119	32	58	91	177	123
New Jersey	138,222	170,236	1,527	3,967	139,749	174,203
New York	42,202	31,466	2,103	1,482	44,305	32,948
North Carolina	21,515	26,104	238	49	21,753	26,153
Pennsylvania	171,359	157,789	1,806	1,820	173,165	159,609
Rhode Island	21,160	15,530	217	143	21,377	15,673
South Carolina	1,023	981	--------	10	1,023	991
Vermont	1,715	1,946	52	33	1,767	1,979
Virginia	21,562	19,181	151	148	21,713	19,329
West Virginia	38,927	43,469	85	55	39,012	43,524
Total	618,946	625,062	13,020	13,331	631,966	638,393
District 2:						
Illinois	272,345	264,194	7,188	7,358	279,533	271,552
Indiana	57,479	83,833	534	351	58,013	84,184
Iowa	5,611	4,950	23	407	5,634	5,357
Kansas	16,538	10,751	131	95	16,669	10,846
Kentucky	1,825	1,056	469	765	2,294	1,821
Michigan	41,517	35,613	3,128	1,510	44,645	37,123
Minnesota	42,612	35,441	527	1,061	43,139	36,502
Missouri	63,466	50,014	1,518	1,387	64,984	51,401
Nebraska	2,109	2,286	7	18	2,116	2,304
North Dakota	4,688	4,348	43	--------	4,731	4,348
Ohio	83,776	82,570	3,478	3,571	87,254	86,141
Oklahoma	10,644	15,901	59	51	10,703	15,952
South Dakota	1,194	133	7	--------	1,201	133
Tennessee	27,285	22,119	76	146	27,361	22,265
Wisconsin	61,522	55,141	555	693	62,077	55,834
Total	692,611	668,350	17,743	17,413	710,354	685,763
District 3:						
Alabama	5,576	5,403	2,345	603	7,921	6,006
Arkansas	8,663	7,425	14	22	8,677	7,447
Louisiana	40,485	47,733	367	--------	40,852	47,733
Mississippi	20,366	9,826	218	755	20,584	10,581
New Mexico	3,782	4,919	21	29	3,803	4,948
Texas	62,608	66,020	561	810	63,169	66,830
Total	141,480	141,326	3,526	2,219	145,006	143,545
District 4:						
Colorado	14,839	9,356	48	25	14,887	9,381
Idaho	1,467	554	7	40	1,474	594
Montana	382	622	5	937	387	1,559
Utah	5,774	2,248	229	111	6,003	2,359
Wyoming	6,866	2,669	1	8	6,867	2,677
Total	29,328	15,449	290	1,121	29,618	16,570
District 5:						
Arizona	1,552	1,296	90	230	1,642	1,526
California	96,140	113,613	4,969	5,713	101,109	119,326
Nevada	530	319	47	17	577	336
Oregon	4,519	2,663	2,746	1,514	7,265	4,177
Washington	8,906	8,181	2,269	2,164	11,175	10,345
Total	111,647	126,072	10,121	9,638	121,768	135,710
Total United States	1,594,012	1,576,259	44,700	43,722	1,638,712	1,619,981

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[1] States are grouped according to petroleum-marketing districts rather than conventional geographic regions.

declined from 20 percent of all sales in 1956 to 17 percent in 1957. The total asphalt and products sold for various miscellaneous uses (1.6 million short tons) remained about the same as in 1956 and represented 10 percent of all asphalt sales compared with 9 percent in 1956.

Sales of road oil declined 13 percent—from 1.5 million short tons in 1956 to 1.3 million in 1957.

TABLE 7.—Sales of petroleum asphalt and road oil in the United States, 1956–57, by districts and States

(Short tons)

District [1] and State	Asphalt cements and fluxes	Emulsified asphalts	Cutback asphalts	Total 1957	Total 1956	Percent change	Road oil		Percent change
							1957	1956	
District 1:									
Connecticut	203,727	6,506	16,085	226,318	144,818	56.3	--------	--------	-------
Delaware	23,925	646	26,757	51,328	55,020	−6.7	108	98	10.2
Florida	443,130	33,221	141,045	617,396	608,654	1.4	--------	1	-------
Georgia	297,509	18,577	76,369	392,455	372,615	5.3	56	31	80.6
Maine	36,405	9,664	53,681	99,750	89,732	11.2	21	--------	-------
Maryland and District of Columbia	222,305	25,581	84,216	332,102	352,193	−5.7	371	130	185.4
Massachusetts	311,859	2,315	84,838	399,012	468,065	−14.8	1,053	649	62.2
New Hampshire	19,481	192	55,862	75,535	54,210	39.3	--------	--------	-------
New Jersey	680,858	16,680	100,092	797,630	771,777	3.3	2,540	2,210	14.9
New York	511,510	91,633	226,998	830,141	853,504	−2.7	9,561	8,317	15.0
North Carolina	257,037	30,569	89,491	377,097	394,656	−4.4	710	714	−0.6
Pennsylvania	632,414	42,786	154,147	829,347	856,559	−3.2	6,054	10,860	−44.3
Rhode Island	97,363	170	36,770	134,303	156,141	−14.0	149	--------	-------
South Carolina	104,211	15	42,246	146,472	149,075	−1.7	--------	103	-------
Vermont	12,396	250	24,635	37,281	29,473	26.5	--------	--------	-------
Virginia	173,184	4,795	126,110	304,089	294,277	3.3	--------	--------	-------
West Virginia	116,005	931	28,994	145,930	153,676	−0.5	636	433	46.9
Total 1957	4,143,319	284,531	1,368,336	5,796,186	--------	−0.1	21,259	--------	−9.7
Total 1956	4,196,386	270,166	1,337,893	--------	5,804,445	-------	--------	23,546	-------
District 2:									
Illinois	1,082,172	15,262	119,203	1,216,637	1,152,753	5.5	211,563	231,750	−8.7
Indiana	235,649	68,254	117,938	421,841	543.422	−22.4	28,802	26,299	9.5
Iowa	146,980	38,160	71,571	256,711	256,655	-------	38,656	42,822	−9.7
Kansas	101,656	217	180,274	282,147	362,730	−22.2	3,376	1,999	68.9
Kentucky	82,601	18,270	92,527	193,398	190,538	1.5	16,700	15,144	10.3
Michigan	252,848	54,487	84,279	391,614	417,202	−6.1	30,974	34,927	−11.3
Minnesota	266,043	14,642	183,357	464,042	482,834	−3.9	15,431	41,103	−62.5
Missouri	263,492	3,933	127,929	395,354	470,679	−16.0	114,497	150,806	−24.1
Nebraska	34,777	292	31,038	66,107	112,279	−41.1	5,316	10,937	−51.4
North Dakota	100,402	17,139	47,111	164,652	166,241	−1.0	5,536	3,244	70.6
Ohio	522,553	117,694	295,173	935,420	921,333	1.5	18,500	15,972	15.8
Oklahoma	125,167	5,148	119,840	250,155	283,944	−11.9	5,807	24,896	−76.7
South Dakota	68.308	885	35,035	104,228	115,326	−9.6	37,199	48,709	−23.6
Tennessee	219,802	16,249	85,241	321,292	391,230	−17.9	581	559	3.9
Wisconsin	187,004	10,346	95,398	292,748	292,103	0.2	112,012	154,594	−27.5
Total 1957	3,689,454	380,978	1,685,914	5,756,346	--------	−6.5	644,950	--------	−19.8
Total 1956	3,818,154	392,832	1,948,283	--------	6,159,269	-------	--------	803,761	-------
District 3:									
Alabama	271,522	37,753	59,752	369,027	390,082	−5.4	173	126	37.3
Arkansas	79,825	22,043	12,632	114,500	199,101	−42.5	1,680	2,450	−31.4
Louisiana	264,278	29,190	33,122	326.590	455.027	−28.2	3.580	4,487	−20.2
Mississippi	108,395	17,850	38,860	165,105	162,541	1.6	458	--------	-------
New Mexico	106,070	4,371	53,129	163,570	166,282	−1.6	1.019	2,085	−51.1
Texas	609,653	16,647	137,092	763,392	953,255	−19.9	32,166	37,692	−14.7
Total 1957	1,439,743	127,854	334,587	1,902,184	--------	−18.2	39,076	--------	−16.6
Total 1956	1,729,604	133,028	463,656	--------	2,326,288	-------	--------	46,840	-------

See footnote at end of table.

TABLE 7. **Sales of Petroleum asphalt and road oil in the United States, 1956–57, by districts and States—Continued**

(Short tons)

District[1] and State	Asphalt cements and fluxes	Emulsified asphalts	Cutback asphalts	Total 1957	Total 1956	Percent change	Road oil		Percent change
							1957	1956	
District 4:									
Colorado	125,628	1,348	40,260	167,236	207,817	−19.5	17,420	25,710	−32.2
Idaho	16,165	2,019	31,881	50,065	64,076	−21.9	24,063	18,189	32.3
Montana	37,964	7,999	38,378	84,341	83,029	1.6	7,866	9,445	−16.7
Utah	62,002	112	54,683	116,797	124,002	−5.8	20,670	26,764	−22.8
Wyoming	86,444	8	56,228	142,680	77,343	84.5	26,430	20,083	31.6
Total 1957	328,203	11,486	221,430	561,119		0.9	96,449		−3.7
Total 1956	318,482	9,961	227,824		556,267			100,191	
District 5:									
Arizona	41,483	10,623	14,961	67,067	103,503	−35.2	15,385	21,413	−28.2
California	1,474,474	134,893	116,754	1,726,121	1,644,980	4.9	460,930	472,043	−2.4
Nevada	11,788	1,371	10,568	23,727	30,659	−22.6	17,734	13,020	36.2
Oregon	248,411	6,677	43,344	298,432	324,279	−8.0	5,978	11,402	−47.6
Washington	140,622	3,642	97,675	241,939	307,691	−21.4	4,107	1,182	247.5
Total 1957	1,916,778	157,206	283,302	2,357,286		−2.2	504,134		−2.9
Total 1956	1,935,389	151,905	323,818		2,411,112			519,060	
Total United States 1957	11,517,497	962,055	3,893,569	16,373,121		−5.1	1,305,868		−12.6
Total United States 1956	11,998,015	957,892	4,301,474		17,257,381			1,493,398	

[1] States are grouped according to petroleum-marketing districts rather than conventional geographic regions.

FOREIGN TRADE

IMPORTS[1]

Imports of solid and liquid petroleum asphalts plus a small quantity of natural asphalts increased substantially from 659,000 short tons, valued at $8.9 million (revised figures), in 1956 to 1,217,000 short tons, valued at $16.9 million, in 1957. Virtually all the petroleum asphalts came from Netherland Antilles and Venezuela, whereas the larger share of the natural asphalts was imported from Trinidad and Tobago. These import totals include quantities received in continental United States and noncontiguous Territories, whereas the monthly imports shown in table 1, taken from the Bureau of Mines Monthly Petroleum Statement, are for continental United States only.

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[1] Figures on imports and exports compiled by Mae B. Price and Elsie D. Page of the Bureau of Mines from records of the Bureau of the Census.

EXPORTS

TABLE 8.—Petroleum asphalt and products exported from the United States, 1956–57, by countries of destination

[Bureau of the Census]

Country	1956		1957	
	Thousand short tons	Thousand dollars	Thousand short tons	Thousand dollars
North America:				
Canada	48	$1,561	36	$1,469
Cuba	3	109	2	103
Mexico	31	406	61	695
Other North America	16	383	6	276
Total	98	2,459	105	2,543
South America:				
Bolivia	5	179	(1)	15
Chile	4	121	7	264
Colombia	5	139	4	132
Ecuador	3	71	(1)	14
Other South America	5	193	5	269
Total	22	703	16	694
Europe	8	536	4	322
Asia:				
India	3	82	3	92
Indonesia	1	27	27	1,769
Korea	2	67	4	158
Pakistan	12	351	(1)	23
Philippines	18	847	24	903
Thailand	4	97	(1)	10
Vietnam, Laos, Cambodia	15	426	34	1,131
Other Asia	5	234	6	236
Total	60	2,131	98	4,322
Africa:				
Belgian Congo	9	307	16	554
Rhodesia and Nyasaland, Federation of	9	276	7	230
Union of South Africa	20	630	23	809
Other Africa	6	299	8	374
Total	44	1,512	54	1,967
Oceania:				
New Zealand	3	125	4	122
Other Oceania	(1)	12	(1)	22
Total	3	137	4	144
Grand total	235	7,478	281	9,992

[1] Less than 1,000 short tons.

TECHNOLOGY

Experimental work by industry groups has indicated that the Nation's railroads can achieve substantial economies in maintenance-of-way costs by treating the entire roadbed, except for the top of rails, with asphalt and cover stone. A specially designed distributor that will draw asphalt from railroad tankcars fore and aft, while mounted on a railroad flatcar, will be constructed in 1958. A specially designed stone-spreading car for applying cover stone will be built in 1958. This equipment will be made available to all railroads wishing to explore fully the economic advantages of this treatment.

Of interest to asphalt-paving technologists is a new laboratory device for compacting and testing asphalt-paving mixtures, developed by the Flexible Pavement Branch of the Army Corps of Engineers. Early indications are that this apparatus will lead to substantial improvements in asphalt-paving-mixture design techniques.

Extensive research is underway on stabilizing fine-grained soils with asphaltic materials. Such construction to date has been almost entirely with soils of little or no plasticity. A current goal is to determine methods and procedures by which soils with a moderate degree of plasticity may be stabilized with asphaltic materials. Lime and other chemical additives may be effective in asphalt stabilization of moderately plastic soils.

Laboratory studies by The Asphalt Institute have indicated that the fine aggregate portion (material passing the No. 8 sieve) has a substantial effect on the performance of asphalt pavement. Details of this work were reported at the 1957 and 1958 meetings of the Highway Research Board.

Joint efforts of asphalt trade organizations, manufacturers, and distributors to simplify and improve the grading system for petroleum asphalts have resulted in reducing the number of paving grades from 9 to 5. Emphasis now has shifted to a similar simplification for liquid grades.

Increased interest is being shown in manufacturing high-grade asphalts as valuable byproducts of propane or other solvent preparation of catalytic-feed stocks from reduced crudes and other virgin oils. Because such asphalts are prepared at low temperature, they are free of cracked components; thus, they generally pass the oliensis test easily. Solvent asphalts also are free of waxy constituents—a frequent bar to meeting market specifications.

Carbon Black

By Ivan F. Avery and Ann C. Mahoney

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GENERAL SUMMARY

CARBON-BLACK production in 1957 decreased 2 percent from the record high of 1956; however, domestic sales and exports increased 2 and 8 percent, respectively, resulting in a 4-percent increase in total sales. Stocks increased 1.8 million pounds in 1957, compared with 111 million pounds in 1956. Sales to the rubber industry, which consumes 96 percent of the total carbon black sold, increased 2 percent. Sales to all other consumers also increased, except sales for use in paint which decreased 10 percent. Furnace black comprised 80 percent of all shipments.

TABLE 1.—Salient statistics of carbon black produced from natural gas and liquid hydrocarbons in the United States, 1953–57, in thousand pounds

	1953	1954	1955	1956	1957
Production:					
Contact process (chiefly channel)	453, 345	378, 741	359, 487	363, 672	357, 557
Furnace processes	1, 157, 092	1, 030, 806	1, 384, 025	1, 476, 296	1, 440, 868
Total	1, 610, 437	1, 409, 547	1, 743, 512	1, 839, 968	1, 798, 425
Shipments:					
Domestic sales	1, 200, 871	1, 095, 256	1, 373, 777	1, 303, 029	1, 331, 366
Exports	358, 620	402, 777	454, 181	425, 328	459, 671
Total	1, 559, 491	1, 498, 033	1, 827, 958	1, 728, 357	1, 791, 037
Losses	12	413	15	961	5, 563
Stocks of producers Dec. 31	410, 284	321, 385	236, 925	347, 574	349, 399
VALUE					
Production ... thousand dollars	104, 868	91, 375	117, 587	120, 252	127, 979
Average per pound ... cents	6. 51	6. 48	6. 74	6. 53	7. 12

SCOPE OF REPORT

Annual statistics of the carbon-black industry were obtained from reports submitted to the Bureau of Mines from all operating plants in the United States by producers who represent 100 percent of commercial production. Carbon black is a very pure grade of quasi-graphitic carbon, with particle diameters ranging from 50 to 5,000 Angstrom units.

Export and import figures are compiled by the Bureau of the Census, United States Department of Commerce. Monthly figures are based on reports prepared by the National Gas Products Association and adjusted to agree with the annual reports received by the Bureau of Mines.

Data are obtained on furnace and contact blacks, the two general types produced commercially. Substantially all contact blacks are made by the channel process. Furnace blacks are broken down into six grades: Semireinforcing Furnace (SRF), High-Modulus Furnace (HMF), Fast-Extruding Furnace (FEF), High-Abrasion Furnace (HAF), Thermal; and Other. Statistics on Superabrasion Furnace (SAF) and Intermediate-Abrasion Furnace (ISAF) are included in Other. The production and uses of the various grades are described in Minerals Yearbooks 1948 and 1949.

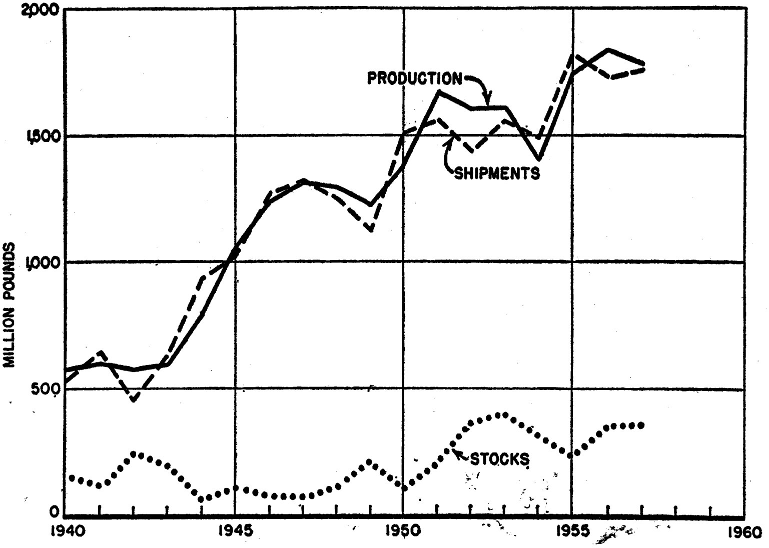

FIGURE 1.—Production, stocks, and shipments of carbon black, 1940–57.

PRODUCTION

Number and Capacity of Plants.—The total number of plants was the same in 1957; however, one plant was transferred to a new operator, increasing the number of operators to 12. Owing to expansion of the 42 existing plants, operating capacity was 375,580 pounds per day larger at the end of 1957 than at the end of 1956.

TABLE 2.—Carbon black produced from natural gas and liquid hydrocarbons in the United States, 1953–57, by States and districts, in thousand pounds

State and district	1953	1954	1955	1956	1957	Change from 1956 (percent)
Louisiana	376, 818	368, 233	502, 793	537, 723	533, 847	−. 72
Texas:						
Panhandle district	542, 006	420, 798	545, 060	574, 234	544, 068	−5. 25
Rest of State	444, 421	393, 622	406, 416	414, 795	415, 455	+. 16
Total Texas	986, 427	814, 420	951, 476	989, 029	959, 523	−2. 98
Other States	247, 192	226, 894	289, 243	313, 216	305, 055	−2. 61
Grand total	1, 610, 437	1, 409, 547	1, 743, 512	1, 839, 968	1, 798, 425	−2. 26

Method and Yield.—The production of furnace black and of contact black each decreased 2 percent in 1957. The average yield of furnace black per thousand cubic feet of natural gas decreased 0.16 pound from 1956. The yield of contact black produced from natural gas was 2.00 pounds per million cubic feet in 1957—about the same as in 1956. However, the overall yield of black produced from oil increased from 4.03 pounds per gallon in 1956 to 4.18 pounds in 1957.

TABLE 3.—Carbon black produced in the United States, 1957, by States and districts, and natural gas and liquid hydrocarbons used in its manufacture

	Producers reporting [1]	Number of plants	Production					
			Furnace black			Contact black		
			Thousand pounds	Value at plant		Thousand pounds	Value at plant	
				Total (thousand dollars)	Cents per pound		Total (thousand dollars)	Cents per pound
Louisiana	5	9	533, 229	34, 405	6. 45	618	130	[2] 21. 03
Texas:								
Panhandle district	8	12	436, 497	28, 274	6. 48	107, 571	12, 155	11. 30
Rest of State	5	12	260, 178	18, 032	6. 93	155, 277	13, 450	8. 66
Total Texas	9	24	696, 675	46, 306	6. 65	262, 848	25, 605	9. 74
Arkansas	1	1	187, 850	12, 464	6. 64	--------	--------	--------
Oklahoma	1	1						
California	1	1						
Kansas	2	2						
New Mexico	3	4	23, 114	1, 151	4. 98	94, 091	7, 918	8. 42
Grand total:								
1957	12	42	1, 440, 868	94, 326	6. 55	357, 557	33, 653	9. 41
1956	11	42	1, 476, 296	89, 035	6. 03	363, 672	31, 217	8. 59

	Natural gas used					Liquid hydrocarbons used			
	Million cubic feet	Average yield [3] (pounds per M cubic feet)		Value		Thousand gallons	Average yield (pounds per gallon)	Value	
		Furnace	Contact	Total (thousand dollars)	Average (cents per M cu. ft.)			Total (thousand dollars)	Average (cents per gallon)
Louisiana	26, 416	8. 60	0. 45	2, 539	9. 61	76, 226	4. 02	6, 464	8. 48
Texas:									
Panhandle district	68, 761	2. 99	1. 92	6, 132	8, 92	82, 982	4. 08	5, 548	6. 69
Rest of State	81, 404	2. 48	2. 11	5, 742	7. 05	46, 835	4. 56	3, 465	7. 40
Total Texas	150, 165	2. 71	2. 03	11, 874	7, 91	129, 817	4. 25	9, 013	6. 94
Arkansas	--------	--------	--------	--------	--------	34, 370	4. 21	2, 229	6. 49
Oklahoma	--------	--------	--------	--------	--------				
California	7, 219	5. 84	--------	1, 278	17. 70				
Kansas									
New Mexico	49, 988	2. 34	1. 96	3, 628	7. 26	--------	--------	--------	--------
Grand total:									
1957	233, 788	7. 94	2. 00	19, 319	8. 26	240, 413	4. 18	17, 706	7. 36
1956	242, 598	8. 10	2. 01	18, 628	7. 68	242, 406	4. 03	16, 468	6. 79

[1] Detail will not add to totals, because some producers operate in more than 1 area.
[2] 1956 figure revised to 21.06. [3] Partly estimated.

TABLE 4.—Production and shipments of carbon black in the United States in 1957, by months and grades, in thousand pounds

PRODUCTION[1]

Month	Furnace								Contact	Total
	Thermal	SRF[2]	HMF[3]	FEF[4]	HAF[5]	ISAF and SAF[6]	Other	Total		
January	13,200	26,196	7,869	17,125	45,049	13,478	3,594	126,511	31,456	157,967
February	10,064	21,504	7,969	13,340	37,312	12,655	2,740	105,584	27,695	133,279
March	12,147	27,037	7,048	20,444	44,061	15,994	3,308	130,039	30,619	160,658
April	13,533	24,598	6,967	18,621	37,805	12,437	3,685	117,646	29,775	147,421
May	14,395	24,084	7,809	19,809	42,907	12,642	3,920	125,566	30,626	156,192
June	11,989	21,278	7,425	17,240	39,677	13,712	3,265	114,586	29,393	143,979
July	11,680	20,982	8,582	18,174	37,514	15,878	3,181	115,991	30,449	146,440
August	10,797	24,166	7,001	18,020	50,738	12,800	2,940	126,462	30,161	156,623
September	10,432	20,867	7,536	19,377	40,639	15,052	2,841	116,744	28,285	145,029
October	11,814	23,849	7,781	18,474	41,901	14,260	3,217	121,296	29,171	150,467
November	9,938	23,556	7,354	19,577	43,363	11,592	2,706	118,086	29,263	147,349
December	11,301	24,362	7,696	20,841	44,159	10,921	3,077	122,357	30,664	153,021
Total	141,290	282,479	91,037	221,042	505,125	161,421	38,474	1,440,868	357,557	1,798,425
SHIPMENTS (INCLUDING EXPORTS)[7]										
January	13,499	25,814	7,641	21,122	41,821	12,454	3,267	125,618	35,541	161,159
February	11,726	24,246	7,678	17,723	40,093	11,511	2,837	115,814	32,430	148,244
March	12,442	37,013	10,576	26,169	58,562	17,038	3,011	164,811	42,022	206,833
April	12,556	19,359	6,803	14,481	33,609	12,214	3,038	102,060	28,159	130,219
May	11,488	21,403	6,822	18,960	43,899	11,981	2,780	117,333	25,808	143,141
June	9,931	21,771	7,533	14,464	37,087	10,817	2,403	104,006	24,886	128,892
July	10,993	22,294	7,126	17,241	40,025	12,360	2,660	112,699	26,486	139,185
August	10,930	21,807	7,967	18,376	43,674	14,007	2,645	119,406	26,787	146,193
September	11,310	20,908	9,202	17,714	41,457	13,130	2,737	116,458	27,329	143,787
October	13,517	26,549	8,027	20,818	47,265	13,857	3,277	133,310	31,001	164,311
November	11,624	23,905	8,443	18,195	45,778	12,783	2,813	123,541	27,720	151,261
December	9,887	20,680	7,383	16,018	40,866	10,232	2,393	107,459	25,916	133,375
Total	139,903	285,749	95,201	221,281	514,136	152,384	33,861	1,442,515	354,085	1,796,600

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[1] Compiled from reports of the National Gas Products Association and of producing companies not included in association figures. Figures adjusted to agree with annual reports of individual producers.

[2] Semireinforcing Furnace. [3] High-Modulus Furnace. [4] Fast-Extrusion Furnace.

[5] High-Abrasion Furnace. [6] Intermediate-Abrasion Furnace and Superabrasion Furnace.

[7] Includes losses.

TABLE 5.—Natural gas and liquid hydrocarbons used in manufacturing carbon black in the United States and average yield, 1953–57

	1953	1954	1955	1956	1957
Natural gas used million cubic feet	300,942	251,176	244,794	242,598	233,788
Average yield of carbon black per thousand cubic feet pounds	3.06	[1] 3.25	3.58	3.56	3.40
Average value of natural gas used per thousand cubic feet cents	5.87	6.89	7.92	7.68	8.26
Liquid hydrocarbons used thousand gallons	187,207	154,919	221,101	242,406	240,413
Average yield of carbon black per gallon pounds	3.68	3.83	3.92	4.03	4.18
Average value of liquid hydrocarbons used per gallon cents	7.69	6.66	6.19	6.79	7.36
Number of producers reporting	16	15	11	11	12
Number of plants	52	50	42	42	42

[1] Revised.

TABLE 6.—Number and capacity of carbon-black plants operated in the United States, 1957

State or district	County or parish	Number of plants				Total daily capacity (pounds)	
		1956		1957		1956	1957
		Contact	Furnace	Contact	Furnace		
Texas: Panhandle district	Carson	1	------	1	------	1,577,000	1,559,790
	Gray	3	1	3	1		
	Hutchinson	1	4	1	4		
	Moore	------	1	------	1		
	Wheeler	------	1	------	1		
Total Panhandle district		5	7	5	7	1,577,000	1,559,790
Rest of State	Aransas	1	1	1	1	1,257,000	1,269,000
	Brazoria	1	------	1	------		
	Brooks	1	------	1	------		
	Ector	1	------	1	------		
	Gaines	1	------	1	------		
	Harris	------	1	------	1		
	Howard	------	1	------	1		
	Montgomery	------	1	------	1		
	Nueces	1	------	1	------		
	Terry	------	1	------	1		
	Winkler	1	------	1	------		
Total rest of State		7	5	7	5	1,257,000	1,269,000
Total Texas		12	12	12	12	2,834,000	2,828,790
Louisiana	Avoyelles	------	1	------	1	1,603,310	1,592,100
	Calcasieu	------	1	------	1		
	Evangeline	------	1	------	1		
	Ouachita	------	2	------	2		
	Richland	1	------	1	------		
	St. Mary	------	3	------	3		
Total Louisiana		1	8	1	8	1,603,310	1,592,100
Arkansas	Union	------	1	------	1	788,000	727,000
California	Contra Costa	------	1	------	1		
Kansas	Grant	------	2	------	2		
Oklahoma	Kay	------	1	------	1		
New Mexico	Lea	3	1	3	1	342,000	345,000
Total United States		16	26	16	26	5,567,310	5,942,890

CONSUMPTION AND USES

Domestic sales of carbon black increased 2 percent in 1957, primarily because of increased consumption of rubber. The rubber industry took 96 percent of the domestic sales in 1957. As a result of a continuing decrease in consumption of natural rubber, which requires a lower

TABLE 7.—Sales of carbon black for domestic consumption in the United States, 1953–57, by uses, in thousand pounds

Use	1953	1954	1955	1956	1957	Change from 1956 (percent)
Rubber	1,133,594	1,023,626	1,286,861	1,244,651	1,271,562	2.16
Ink	45,801	48,797	55,313	42,047	43,153	2.63
Paint	8,464	7,681	13,661	13,231	11,951	−9.67
Miscellaneous	13,012	15,152	17,942	3,100	4,700	51.61
Total	1,200,871	1,095,256	1,373,777	1,303,029	1,331,366	2.17

loading than synthetic rubber, the average loading of carbon black in rubber rose from 844 pounds in 1956 to 847 pounds per long ton in 1957. Natural rubber comprised 37 percent of the total virgin-rubber consumption in 1957, compared with 39 percent in 1956. The demand for carbon black for paint declined for the second consecutive year and was 10 percent below that in 1956.

STOCKS

Total stocks increased 1.8 million pounds in 1957. Stocks of contact black increased 3.5 million pounds, whereas stocks of furnace black decreased 1.6 million.

TABLE 8.—Producers' stocks of contact- and furnace-type blacks in the United States, December 31, 1953–57, in thousand pounds

Year	Furnace							Contact	Tota
	SRF[1]	HMF[1]	FEF[1]	HAF[1]	ISAF and SAF[1]	Other	Total		
1953	30,861	25,801	38,638	57,757	--------	20,875	173,932	236,352	410,284
1954	18,113	22,949	27,895	48,130	--------	[2] 16,850	133,937	187,448	321,385
1955	19,680	17,554	25,065	53,582	14,108	[2] 9,561	139,550	97,374	236,924
1956	78,552	16,500	35,374	69,253	47,081	[2] 22,270	269,030	78,544	347,574
1957	75,282	12,336	35,135	60,242	56,118	[2] 28,270	267,383	82,016	349,399

[1] For explanation, see footnotes to table 4.
[2] Includes thermal grade.

VALUE

The open-market price for carbon black increased in 1957 for the first time since 1953, raising the average price of all carbon black 0.59 cent per pound over 1956. Contact black increased 0.82 cent per pound in 1957 and furnace black 0.52 cent. The average value of natural gas used as a raw material increased 0.58 cent per thousand cubic feet in 1957. The average feedstock value of oil rose 0.57 cent per gallon in 1957.

TABLE 9.—Prices of carbon black in carlots, f. o. b. plant, 1953–57, in cents per pound

[Oil, Paint and Drug Reporter]

Date	Channel blacks		Furnace blacks			
	Ordinary rubber grades[1]		Semi-reinforcing grades (SRF)	High-Modulus grades (HMF)	Fast Extrusion grades (FEF)	High-Abrasion grades (HAF)
	Bags	Bulk	Bags	Bags	Bags	Bags
Jan. 1, 1953	7.40	7.00	4.00	5.50	6.00	7.90
Jan. 1, 1954	7.40	7.00	4.50	5.50	6.00	7.90
Jan. 1, 1955	7.40	7.00	4.50	5.50	6.00	7.90
Jan. 1, 1956	7.40	7.00	4.50	5.50	6.00	7.90
Jan. 1, 1957	7.40	7.00	4.50	5.50	6.00	7.90
Dec. 9, 1957	7.75	7.25	5.75	6.25	6.75	7.75

[1] Chiefly Easy-Processing (EPC) and Medium-Processing (MPC), but also includes Hard-Processing (HPC) and Conductive (CC) channel blacks.

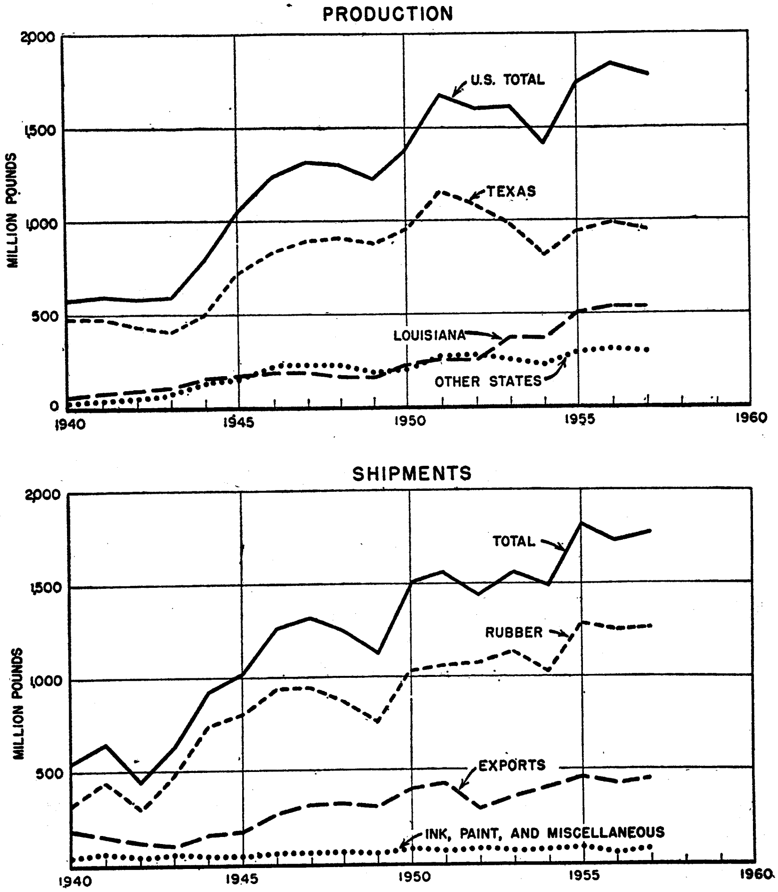

FIGURE 2.—Production and shipments of carbon black, 1940–57.

FOREIGN TRADE[1]

Imports.—Imports of acetylene black from Canada, our only source of supply, declined from 8.4 million pounds in 1956 to 7.6 million pounds in 1957. The average value increased from 16.5 cents per pound in 1956 to 17.7 cents in 1957. Only 20 pounds of carbon black was imported in 1957.

Exports.—Exports of carbon black, particularly furnace black, rose in 1957. Exports of furnace black increased 35.6 million pounds, whereas those of contact black decreased 1.3 million pounds. Countries previously receiving the major proportion of exports increased their requirements, with the exception of France and Canada, whose needs declined.

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[1] Figures on imports and exports compiled by Mae B. Price and Elsie D. Jackson, of the Bureau of Mines, from records of the U. S. Department of Commerce.

TABLE 10.—Carbon black exported from the United States, 1955–57, by countries of destination

[Bureau of the Census]

Country	1955		1956		1957	
	Thousand pounds	Thousand dollars	Thousand pounds	Thousand dollars	Thousand pounds	Thousand dollars
North America:						
Canada	45,939	$3,475	42,856	$3,081	37,706	$2,952
Cuba	1,316	108	1,551	123	2,039	169
Mexico	15,583	1,230	15,019	1,128	15,779	1,289
Other North America	85	8	97	10	102	13
Total	62,923	4,821	59,523	4,342	55,626	4,423
South America:						
Argentina	19,557	2,035	13,404	1,161	19,128	1,816
Brazil	25,320	2,265	20,157	1,792	20,713	1,765
Chile	3,555	291	1,795	145	1,472	121
Colombia	6,702	573	6,674	546	7,203	625
Peru	1,917	160	2,163	181	3,305	282
Uruguay	2,306	204	1,419	112	1,321	111
Venezuela	4,040	352	5,474	441	6,906	599
Other South America	94	11	64	6	2	2
Total	63,491	5,891	51.150	4,384	60,050	5,321
Europe:						
Austria	1,932	159	356	41	1,484	112
Belgium-Luxembourg	13,921	1,247	13,610	1,148	13,368	1,149
Denmark	822	87	481	70	1,036	111
Finland	1,192	111	1,096	96	872	87
France	83,581	7,510	87,483	7,359	81,162	7,082
Germany, West	13,411	1,368	14,221	1,336	18,095	1,575
Greece	379	33	522	39	503	45
Ireland	551	51	485	44	102	15
Italy	43,766	3,750	42,211	3,545	43,404	3,701
Netherlands	7,721	741	6,852	628	7,202	692
Norway	1,838	161	1,679	137	1,889	164
Portugal	1,479	119	831	68	1,978	159
Spain	8,054	696	6,629	545	11,066	948
Sweden	9,344	848	10,335	874	11,433	1,037
Switzerland	4,303	444	5,146	560	5,926	566
Trieste	-----	-----	134	12	121	8
United Kingdom	32,613	3,453	26,816	2,837	27,333	3,033
Yugoslavia	811	82	1,414	134	1,523	138
Total	225,718	20,860	220,301	19,473	228,497	20,622
Asia:						
India	13,743	1,145	13,105	1,062	14,385	1,178
Indonesia	5,147	475	5,023	484	6,234	618
Israel	2,979	245	1,750	139	3,174	258
Japan	20,042	1,947	27,738	2,448	31,003	2,848
Korea	278	24	396	32	1,041	99
Malaya	824	74	1,000	84	634	58
Pakistan	458	39	199	19	421	36
Philippines	300	29	1,969	165	6,016	535
Taiwan	106	10	120	12	258	25
Turkey	520	55	290	29	424	35
Vietnam, Laos, and Cambodia	22	3	36	7	83	8
Other Asia	683	65	782	78	923	82
Total	45,102	4,111	52,408	4,559	64,596	5,780
Africa:						
Egypt	151	13	256	21	1,602	136
Union of South Africa	22,321	2,024	18,735	1,566	24,174	2,169
Other Africa	239	18	135	10	181	18
Total	22,711	2,055	19,126	1,597	25,957	2,323
Oceania:						
Australia	29,164	2,534	18,125	1,371	19,984	1,575
New Zealand	5,072	463	4,695	379	4,961	424
Total	34,236	2,997	22,820	1,750	24,945	1,999
Grand total	454,181	40,735	425,328	36,105	459,671	40,468

TABLE 11.—Carbon black exported from the United States in 1957, by months, in thousand pounds

[Bureau of the Census]

Month	Contact	Furnace	Total
January	17,100	19,810	36,910
February	19,895	25,045	44,940
March	14,150	25,095	39,245
April	16,610	33,772	50,382
May	15,633	28,180	43,813
June	11,020	21,384	32,404
July	13,538	16,864	30,402
August	12,699	19,501	32,200
September	14,240	21,058	35,298
October	12,006	24,934	36,940
November	12,792	25,467	38,259
December	14,019	24,859	38,878
Total:			
1957	173,702	285,969	459,671
1956	175,004	250,324	425,328

WORLD PRODUCTION

TABLE 12.—World production of carbon black, by countries,[1] 1953–57, in thousand pounds

[Compiled by Pearl J. Thompson]

Country	1953	1954	1955	1956	1957
Germany	88,094	105,847	122,624	127,122	149,670
Japan	19,365	15,926	16,667	25,159	30,611
United Kingdom	102,592	145,600	170,016	182,784	234,035
United States	1,610,437	1,409,547	1,743,512	1,839,968	1,798,425
Yugoslavia	2,202	1,958	2,837	3,602	4,242

[1] Canada became a producer of carbon black in 1953, with completion in June of an oil-black furnace having a capacity of 20 million pounds per year at Sarnia, Ontario. The capacity was increased to 60 million pounds in 1956. The actual production is not published to avoid disclosing individual company confidential data.

Natural Gas

By Ivan F. Avery, Ann C. Mahoney, and Lulie V. Harvey

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GENERAL SUMMARY

The steady growth of the natural-gas industry continued in 1957. Marketed production of natural gas totaled 10,680 billion cubic feet—6 percent over 1956. The average value at the wellhead increased from 10.8 cents per thousand cubic feet in 1956 to 11.3 cents in 1957. Residential and commercial sales increased 7 and 8 percent, respectively, over 1956. The average number of residential and commercial customers reached a new record of 31.1 million in 1957, compared with 30.1 million in 1956.

The average value of natural gas at the point of consumption in 1957 was 43.1 cents per thousand feet, 1.6 cents above the 1956 average of 41.5.

TABLE 1.—Salient statistics of natural gas in the United States, 1953–57

	1953	1954	1955	1956	1957
Million cubic feet					
Supply:					
Marketed production [1]	8, 396, 916	8, 742, 546	9, 405, 351	10, 081, 923	10, 680, 258
Withdrawn from storage	246, 802	330, 177	437, 251	452, 762	480, 981
Imports	9, 225	6, 847	10, 888	10, 380	37, 941
Total supply	8, 652, 943	9, 079, 570	9, 853, 490	10, 545, 065	11, 199, 180
Disposition:					
Consumption	7, 979, 338	8, 402, 852	9, 070, 343	9, 706, 878	10, 279, 775
Exports	28, 322	28, 726	31, 029	35, 963	41, 655
Stored	404, 838	432, 283	505, 185	589, 232	672, 377
Lost in transmission, etc	240, 445	215, 709	246, 933	212, 992	205, 373
Total disposition	8, 652, 943	9, 079, 570	9, 853, 490	10, 545, 065	11, 199, 180
Value					
Production (at wells)...thousand dollars	774, 966	882, 501	978, 357	1, 083, 812	1, 201, 759
Average per M cubic feet...cents	9.2	10.1	10.4	10.8	11.3

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[1] Comprises gas sold or consumed by producers, including losses in transmission, quantities added to storage, and increases in gas in pipelines.

SCOPE OF REPORT

Data on natural-gas production, consumption, and value are collected by annual questionnaires sent to oil and gas producers, natural-gasoline-plant operators, gas-pipeline companies, and gas-utility companies. A separate report was filed by the respondent for each State in which he operated.

Volumes are reported at the pressure base selected by the reporting company; however, if the reported pressure base deviates more than 5 percent from 14.65 pounds per square inch absolute at 60° F., it is corrected to this base.

Reports are received covering approximately 75 percent of the gross natural-gas production. The large number of respondents and the difficulty of contacting each small producer make direct compilation of total production impractical. The bulk of the output of nonreporting producers is furnished in the purchases of reporting companies. Marketed production for each State equals consumption in the State, plus gas placed in storage, plus shipments to other States, less gas withdrawn from storage, less receipts from other States.

GOVERNMENT REGULATIONS

The District of Columbia Circuit Court of Appeals, on November 21, 1957, handed down the "Memphis Decision", that prohibited interstate pipeline companies from putting higher rates into effect, pending Federal Power Commission review of their legality, "unless their customers agreed to the increases in advance." The Appeals Court ruling was based on a suit brought against United Gas Pipe Line Co. by the Memphis, Tenn., Light, Gas, and Water Division and the Mississippi Valley Gas Co.

RESERVES

The American Gas Association Committee on Natural-Gas Reserves reported that estimated proved recoverable domestic reserves of natural gas totaled 246.6 trillion cubic feet at the end of 1957, an increase of 8.8 trillion cubic feet during the year.

Louisiana achieved the most significant gain in proved recoverable reserves in 1957 with an increase of 6.4 trillion cubic feet.

TABLE 2.—Estimated proved recoverable reserves of natural gas in the United States, 1956–57, in million cubic feet [1]

[Committee on Natural-Gas Reserves, American Gas Association]

State	Reserves as of Dec. 31, 1956	Changes in reserves during 1957			
		Extensions and revisions [2]	Discoveries of new fields and new pools in old fields [2]	Net change in underground storage [3]	Net production [4]
Arkansas	1, 171, 527	103, 994	47, 818	145	40, 462
California [5]	8, 751, 233	516, 043	144, 989	12, 616	471, 988
Colorado	2, 422, 769	40, 381	55, 244	1, 385	139, 100
Illinois	219, 705	−36, 175	0	2, 085	19, 243
Indiana	33, 772	0	270	950	4, 040
Kansas	17, 566, 257	2, 136, 392	218, 473	565	625, 709

See footnotes at end of table.

TABLE 2.—Estimated proved recoverable reserves of natural gas in the United States, 1956–57, in million cubic feet [1]—Continued

[Committee on Natural-Gas Reserves, American Gas Association]

State	Reserves as of Dec. 31, 1956	Changes in reserves during 1957			
		Extensions and revisions [2]	Discoveries of new fields and new pools in old fields [2]	Net change in underground storage [3]	Net production [4]
Kentucky	1, 245, 602	43, 714	7, 640	−2, 911	69, 000
Louisiana [5]	45, 053, 999	4, 137, 189	4, 366, 891	0	2, 122, 125
Michigan	361, 786	46, 625	1, 750	44, 015	10. 148
Mississippi	2, 403, 326	70, 809	28, 983	462	205, 840
Montana	696, 351	649	957	4, 324	31, 831
Nebraska	225, 402	−9, 014	1, 734	0	28, 783
New Mexico	23, 472, 707	−684, 776	215, 588	−1, 684	743, 826
New York	85, 249	3, 200	800	7, 249	3, 116
North Dakota	397, 493	193, 105	170, 232	0	17, 398
Ohio	853, 607	49, 900	8, 850	21, 718	32, 261
Oklahoma	13, 775, 049	577, 123	839, 797	12, 080	944, 569
Pennsylvania	776, 212	141, 521	14, 880	27, 986	107, 004
Texas	112, 728, 750	3, 197, 704	2, 665, 334	11, 506	5, 518, 776
Utah	619, 786	192, 436	65, 154	0	18, 082
Virginia	35, 557	3, 375	1, 125	0	2, 536
West Virginia	1, 561, 737	131, 686	27, 960	23, 524	183, 977
Wyoming	3, 235, 932	261, 026	113, 798	796	154, 119
Other States [6]	80, 761	1, 412	726	12, 922	8, 426
Total	237, 774, 569	11, 118, 319	8, 998, 993	179, 733	11, 502, 359

State	Reserves as of Dec. 31, 1957				
	Non-associated [7]	Associated [8]	Dissolved [9]	Underground storage [10]	Total
Arkansas	746, 150	294, 187	237, 943	4, 742	1, 283, 022
California [5]	2, 387, 342	2, 035, 866	4, 451, 261	78, 424	8, 952, 893
Colorado	1, 689, 189	120, 895	565, 919	4, 676	2, 380, 679
Illinois	5, 442	500	130, 701	29, 729	166, 372
Indiana	1, 750	1, 680	19, 351	8, 171	30, 952
Kansas	18, 628, 827	283, 726	326, 227	57, 198	19, 295, 978
Kentucky	1, 142, 060	0	64, 117	18, 868	1, 225, 045
Louisiana [5]	40, 804, 849	7, 474, 784	3, 156, 321	0	51, 435, 954
Michigan	84, 941	22, 788	58, 192	278, 107	444, 028
Mississippi	1, 551, 952	475, 940	267, 171	2, 677	2, 297, 740
Montana	515, 382	40, 823	79, 140	35, 105	670, 450
Nebraska	114, 997	12, 315	62, 027	0	189, 339
New Mexico	16, 675, 018	4, 055, 991	1, 477, 156	49, 844	22, 258, 009
New York	37, 962	0	233	55, 187	93, 382
North Dakota	105, 996	0	637, 436	0	743, 432
Ohio	557, 215	0	39, 460	305, 139	901, 814
Oklahoma	7, 039, 245	3, 451, 540	3, 666, 629	102, 066	14, 259, 480
Pennsylvania	470, 958	0	28, 715	353, 922	853, 595
Texas [5]	71, 443, 050	25, 782, 103	15, 830, 624	28, 741	113, 084, 518
Utah	566, 934	19, 073	273, 287	0	859, 294
Virginia	37, 521	0	0	0	37, 521
West Virginia	1, 262, 271	0	66, 033	232, 626	1, 560, 930
Wyoming	2, 551, 332	221, 829	665, 257	19, 015	3, 457, 433
Other States [6]	52, 988	0	16, 676	17, 731	87, 395
Total	168, 473, 371	44, 294, 040	32, 119, 876	1, 681, 968	246, 569, 255

[1] Volumes are reported at a pressure base of 14.65 pounds per square inch absolute and at a standard temperature of 60° F.

[2] Excludes gas loss from recovery of natural-gas liquids.

[3] Net difference between gas stored in and gas withdrawn from underground storage reservoirs, including adjustment.

[4] Net production equals gross withdrawals less gas injected into underground reservoirs; changes in under ground storage and gas loss from recovery of natural-gas liquids are excluded. December production partly estimated.

[5] Includes offshore reserves.

[6] Alabama, Arizona, Florida, Iowa, Maryland, Missouri, and Nevada.

[7] Nonassociated gas is free gas not in contact with crude oil in the reservoir.

[8] Associated gas is free gas in contact with crude oil in the reservoir.

[9] Dissolved gas is gas in solution with crude oil in the reservoir.

[10] Net gas placed in underground reservoirs for storage purpose only.

GROSS WITHDRAWAL

Gross withdrawal equals marketed production, plus the quantity repressured, plus the partly estimated quantity vented and wasted. Gross withdrawals increased 4 percent over 1956. The quantity of gas vented and wasted is compiled from data given on the reporting forms, supplemented by estimated waste derived from figures published by Natural Gas Reserves Committee of the American Gas Association and State conservation bodies.

UNDERGROUND STORAGE OF NATURAL GAS

The American Gas Association (AGA) Committee on underground-storage facilities reported a further increase in storage facilities in 1957; 199 underground storage pools were in operation at the end of the year. Ultimate capacity of these fields aggregated 2,603 billion cubic feet. Total gas in storage in 1957 totaled 1,674 billion cubic feet, a new record, and was equivalent to nearly 70 percent of total annual sales of gas to residential users throughout the nation.

In 1957, 672 billion cubic feet of natural gas was put into storage, and 481 billion cubic feet was withdrawn, resulting in a net addition to storage of 191 billion cubic feet.

TABLE 3.—Gross withdrawals and disposition of natural gas in the United States, 1956–57, by States, in million cubic feet

State	Gross withdrawals[1]			Disposition		
	From gas wells	From oil wells	Total	Marketed production[2]	Repressuring	Vented and wasted[3]
1956						
Arkansas	16.000	37,000	53,000	30,162	16,269	6,569
California	225,000	542,000	767,000	504,458	254,872	7,670
Colorado	29,000	73,000	102,000	54,205	32,500	15,295
Illinois	700	36,000	36.700	6,177	1,870	28,653
Indiana	200	3,800	4,000	791	40	3,169
Kansas	509,000	65,000	574.000	526,091	2,141	45,768
Kentucky	72,000	4.000	76,000	73,687	20	2,293
Louisiana	1,696,000	450,000	2,146,000	1,886.302	190,768	68,930
Maryland	4,619	----------	4,619	4,619	----------	----------
Michigan	8,500	6,500	15,000	10,911	2,498	1,591
Mississippi	213,000	74,000	287,000	185,137	66,654	35,209
Montana	23,000	4,000	27,000	25,847	125	1,028
Nebraska	10.000	5,000	15,000	10,851	----------	4,149
New Mexico	409,000	239,000	648.000	626,340	1,470	20,190
New York	7,000	1,000	8.000	7,532	----------	468
North Dakota	16,000	1,000	17,000	11,725	----------	5,275
Ohio	24,000	2,400	26,400	25,368	57	975
Oklahoma	479,000	508,000	987,000	678,603	113,561	194,836
Pennsylvania	88,500	1,700	90,200	89,806	117	277
Texas	4,180,000	1,809,000	5,989,000	4,999,889	720,905	268,206
Utah	17,000	1,000	18,000	17,268	----------	732
Virginia	2,926	----------	2,926	2,926	----------	----------
West Virginia	202,000	4,000	206,000	204,717	127	1,156
Wyoming	47,000	55,000	102,000	80,471	7,123	14,406
Other States[4]	114	200	314	155	----------	159
Total	8.279,559	3,922,600	12,202,159	10,064,038	1,411,117	727,004
1957						
Arkansas	18,000	36,000	54.000	31,327	16,045	6,628
California	144.000	609,000	753,000	492,338	255,644	5,018
Colorado	46,000	122.000	168,000	95,259	35,486	37,255
Illinois	700	20,300	21,000	9,647	130	11,223
Indiana	100	4,000	4,100	671	----------	3,429
Kansas	570,000	64,000	634,000	586,690	1,199	46,111
Kentucky	68,000	3,000	71,000	70,024	----------	976

See footnotes at end of table.

TABLE 3.—Gross withdrawals and disposition of natural gas in the United States, 1956–57, by States, in million cubic feet—Continued

State	Gross withdrawals[1]			Disposition		
	From gas wells	From oil wells	Total	Marketed production[2]	Repressuring	Vented and wasted[3]
1957—Continued						
Louisiana	1,877,000	470,000	2,347,000	2,078,901	187,057	81,042
Maryland	4,649	------	4,649	4,649	------	------
Michigan	8,000	5,000	13,000	9,122	3,075	803
Mississippi	193,000	81,000	274,000	169,967	66,608	37,425
Montana	23,000	8,000	31,000	28,638	263	2,099
Nebraska	14,000	12,000	26,000	14,249	------	11,751
New Mexico	509,000	260,000	769,000	723,004	1,530	44,466
New York	2,800	300	3,100	2,869	------	231
North Dakota	1,000	18,000	19,000	15,450	3,550	------
Ohio	28,000	4,500	32,500	30,384	57	2,059
Oklahoma	550,000	540,000	1,090,000	719,794	109,888	260,318
Pennsylvania	101,000	3,000	104,000	101,801	112	2,087
Texas	4,251,000	1,850,000	6,101,000	5,156,215	724,615	220,170
Utah	16,000	5,500	21,500	16,824	370	4,306
Virginia	2,536	------	2,536	2,465	------	71
West Virginia	200,000	4,000	204,000	202,440	119	1,441
Wyoming	89,000	70,000	159,000	117,256	11,515	30,229
Other States[4]	50	234	284	274	------	10
Total	8,716,835	4,189,834	12,906,669	10,680,258	1,417,263	809,148

[1] Marketed production plus quantities used in repressuring, vented, and wasted.

[2] Comprises gas sold or consumed by producers, including losses in transmission, quantities added to storage, and increases in gas in pipelines.

[3] Partly estimated. Includes direct waste on producing properties and residue blown to the air.

[4] Alabama, Arizona, Florida, Missouri, and Tennessee.

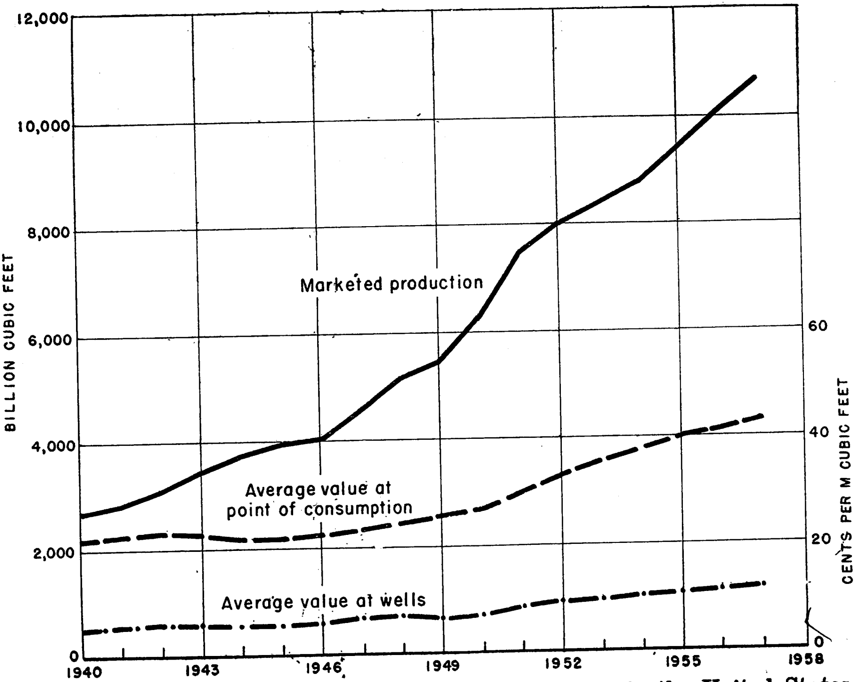

FIGURE 1.—Production and average value of natural gas in the United States 1940–57.

TABLE 4.—Natural gas stored underground in and withdrawn from storage fields, 1956–57, by State of location, in million cubic feet

State	1956			1957		
	Total stored	Total withdrawn	Net stored	Total stored	Total withdrawn	Net stored
Arkansas	114	1	113	28	113	−85
California	29,539	21,911	7,628	36,725	23,487	13,238
Colorado	---	---	---	1,714	---	1,714
Illinois	10,900	1,684	9,216	10,244	2,409	7,835
Indiana	2,698	1,633	1,065	3,181	2,929	252
Iowa	326	427	−101	10,823	3,073	7,750
Kansas	24,340	22,346	1,994	24,035	23,013	1,022
Kentucky	7,985	6,653	1,332	8,526	7,944	582
Louisiana	---	---	---	78	---	78
Maryland	---	---	---	---	---	---
Michigan	97,288	72,788	24,500	104,891	69,032	35,859
Mississippi	2,541	1,407	1,134	1,768	1,316	452
Missouri	1,977	888	1,089	3,483	2,376	1,107
Montana	3,006	2,575	431	6,796	2,510	4,286
Nebraska	---	218	−218	---	127	−127
New Mexico	6,735	8,312	−1,577	5,101	8,093	−2,992
New York	20,865	14,520	6,345	26,633	15,968	10,665
North Dakota	---	---	---	---	---	---
Ohio	93,008	71,130	21,878	90,442	73,957	16,485
Oklahoma	24,227	17,441	6,786	24,705	17,783	6,922
Pennsylvania	142,272	112,356	29,916	150,367	133,310	17,057
Texas	9,565	14,444	−4,879	53,083	7,262	45,821
Virginia	---	---	---	---	---	---
West Virginia	108,540	79,084	29,456	104,761	82,639	22,122
Wisconsin	108	---	108	125	---	125
Wyoming	3,198	2,944	254	4,868	3,640	1,228
Total	589,232	452,762	136,470	672,377	480,981	191,396

TABLE 5.—Marketed production of natural gas in the United States, 1953–57, by States [1]

State	Quantity (million cubic feet)					Change from 1956 (percent)	Estimated value at wells (thousand dollars)	
	1953	1954	1955	1956	1957		1956	1957
Alabama	41	87	282	42	190	352.4	3	12
Arizona	---	---	15	21	---	---	3	---
Arkansas	41,510	33,471	32,123	30,162	31,327	3.9	1,810	2,256
California	531,346	507,289	538,178	504,458	492,338	−2.4	113,503	116,684
Colorado	28,509	45,705	49,152	54,205	95,259	75.7	5,312	9,526
Florida	34	35	36	35	34	−2.9	3	4
Illinois	9,282	9,475	8,033	6,177	9,647	56.2	933	1,495
Indiana	701	735	1,226	791	671	−15.2	96	88
Kansas	420,607	412,369	471,041	526,091	586,690	11.5	59,448	66,883
Kentucky	71,405	72,713	73,214	73,687	70,024	−5.0	17,022	16,666
Louisiana	1,293,644	1,399,222	1,680,032	1,886,302	2,078,901	10.2	215,038	232,837
Maryland	1,408	1,394	3,116	4,619	4,649	0.6	1,169	1,218
Michigan	7,774	6,962	8,300	10,911	9,122	16.4	1,451	1,715
Mississippi	154,254	140,448	163,167	185,137	169,967	−8.2	18,143	17,507
Missouri	15	16	15	12	12	---	2	2
Montana	27,889	30,252	28,255	25,847	28,638	10.8	1,758	2,062
Nebraska	6,748	6,801	12,515	13,541	14,249	5.2	2,844	2,280
New Mexico	399,086	449,346	540,664	626,340	723,004	15.4	55,118	67,962
New York	2,347	2,598	3,637	4,098	2,869	−30.0	1,160	815
North Dakota	498	1,093	5,256	11,725	15,450	31.8	950	1,468
Ohio	37,542	28,824	33,756	25,368	30,384	19.8	6,088	7,201
Oklahoma	599,955	616,355	614,976	678,603	719,794	6.1	54,288	59,743
Pennsylvania	105,558	145,934	99,172	104,508	101,801	2.6	33,652	31,660
South Dakota	5	7	---	---	---	---	---	---
Tennessee	89	89	39	45	38	−15.6	6	6
Texas	4,383,158	4,551,232	4,730,798	4,999,889	5,156,215	3.1	434,990	500,153
Utah	7,075	16,024	17,163	17,268	16,824	−2.6	2,435	2,473
Virginia	3,697	1,401	968	2,926	2,465	−15.8	811	661
West Virginia	186,477	191,601	212,403	204,717	202,440	−1.1	48,518	48,181
Wyoming	76,262	71,068	77,819	84,398	117,256	38.9	7,258	10,201
Total	8,396,916	8,742,546	9,405,351	10,081,923	10,680,258	5.9	1,083,812	1,201,759

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[1] Comprises gas either sold or consumed by producers, including losses in transmission, quantities added to storage, and increases of gas in pipelines.

TABLE 6.—Gas wells in the United States, 1956–57, by States

State	Drilled during 1956 [1]	Producing Dec. 31, 1956	Drilled during 1957 [1]	Producing Dec. 31, 1957
Arkansas	13	255	21	260
California	51	465	53	500
Colorado	107	150	91	240
Illinois	63	40	19	40
Indiana	7	405	14	410
Kansas	381	5, 450	333	5, 650
Kentucky	165	4, 200	164	4, 300
Louisiana	401	4, 000	380	4, 300
Michigan	12	260	47	270
Mississippi	5	235	3	238
Missouri [2]	----------	----------	----------	----------
Nebraska [2]	1	33	5	38
Montana	7	1, 065	15	1, 090
New Mexico	674	2, 830	606	3, 300
New York	14	1, 160	5	1, 150
Ohio	178	6, 300	201	6, 450
Oklahoma	321	4, 300	234	4, 450
Pennsylvania	236	16, 250	292	16, 300
Tennessee	----------	28	7	30
Texas	894	12, 240	881	13, 400
West Virginia	506	14, 200	466	14, 200
Wyoming	52	265	46	280
Other States [3]	27	130	29	145
Total	4, 115	74, 261	3, 912	77, 041

[1] From Oil and Gas Journal.
[2] Missouri and Nebraska combined to avoid disclosing individual company operations.
[3] Alabama, Arizona, Maryland, North Dakota, South Dakota, Utah, and Virginia.

INTERSTATE SHIPMENTS, IMPORTS, AND EXPORTS

Interstate shipments including exports increased 8 percent in 1957. Interstate shipments comprised 57 percent of marketed production in 1957 compared with 56 percent in 1956.

Exports to Canada amounted to 30,867 million cubic feet, compared with 16,819 million cubic feet in 1956, and exports to Mexico totaled 10,788 million cubic feet. Montana received 10,318 million cubic

TABLE 7.—Marketed production, interstate movements, and total consumption of natural gas in the United States, in 1957, in million cubic feet

Census regions and States	Marketed production		Interstate movements		Transmission loss and unaccounted for	Change in underground storage	Consumption
	Quantity	Average value at wellhead (cents per thousand cubic feet)	Quantity shipped	Quantity received			
New England:							
Connecticut	----------	----------	----------	21, 262	934	----------	20, 328
Maine	----------	----------	----------	----------	----------	----------	----------
Massachusetts	----------	----------	----------	58, 500	1, 874	----------	56, 626
New Hampshire	----------	----------	----------	1, 876	89	----------	1, 787
Rhode Island	----------	----------	----------	8, 328	189	----------	8, 139
Vermont	----------	----------	----------	----------	----------	----------	----------
Total: 1957	----------	----------	----------	89, 966	3, 086	----------	86, 880
1956	----------	----------	----------	78, 524	2, 037	----------	76, 487
Middle Atlantic:							
New Jersey	----------	----------	----------	106, 710	6, 227	----------	100, 483
New York	2, 869	28. 4	2, 440	323, 238	13, 849	10, 665	299, 153
Pennsylvania	101, 801	31. 1	69, 058	443, 355	13, 228	17, 057	445, 813
Total: 1957	104, 670	31. 0	71, 498	873, 303	33, 304	27, 722	845, 449
1956	108, 606	32. 1	83, 281	827, 082	26, 321	36, 261	789, 825
East North Central:							
Illinois	9, 647	15. 5	1, 178	432, 787	10, 581	7, 835	422, 840
Indiana	671	13. 1	194	151, 380	6, 426	252	145, 179
Michigan	9, 122	18. 8	----------	305, 320	6, 230	35, 859	272, 353
Ohio	30, 384	23. 7	----------	578, 411	8, 557	16, 485	583, 753
Wisconsin	----------	----------	----------	63, 316	3, 599	125	59, 592
Total: 1957	49, 824	21. 1	1, 372	1, 531, 214	35, 393	60, 556	1, 483, 717
1956	43, 247	19. 8	1, 103	1, 454, 545	29, 134	56, 767	1, 410, 788

TABLE 7.—Marketed production, interstate movements, and total consumption of natural gas in the United States, in 1957, in million cubic feet—Continued

Census regions and States	Marketed production		Interstate movements		Transmission loss and unaccounted for	Change in underground storage	Consumption
	Quantity	Average value at wellhead (cents per thousand cubic feet)	Quantity shipped	Quantity received			
West North Central:							
Iowa	--------	--------	--------	165, 150	2, 436	7, 750	154, 964
Kansas	586, 690	11. 4	474, 255	232, 036	−384	1, 022	343, 833
Minnesota	--------	--------	--------	148, 289	557	--------	147, 732
Missouri	12	16. 7	--------	231, 404	6, 781	1, 107	223, 528
Nebraska	14, 249	16. 0	--------	102, 967	1, 017	−127	116, 326
North Dakota	15, 450	9. 5	3, 830	2, 249	116	--------	13, 753
South Dakota	--------	--------	--------	19, 189	938	--------	18, 251
Total: 1957	616, 401	11. 5	478, 085	901, 284	11, 461	9, 752	1, 018, 387
1956	551, 369	11. 5	427, 664	868, 966	23, 730	2, 764	966, 177
South Atlantic:							
Delaware	--------	--------	--------	6, 315	301	--------	6, 014
District of Columbia	--------	--------	--------	16, 427	726	--------	15, 701
Florida	34	13. 0	--------	39, 012	175	--------	38, 871
Georgia	--------	--------	--------	157, 638	2, 860	--------	154, 778
Maryland	4, 649	26. 2	1, 969	49, 266	769	--------	51, 177
North Carolina	--------	--------	--------	20, 580	1, 047	--------	19, 533
South Carolina	--------	--------	--------	40, 842	1, 101	--------	39, 741
Virginia	2, 465	26. 8	2, 421	50, 920	2, 437	--------	48, 527
West Virginia	202, 440	23. 8	149, 235	134, 896	6, 459	22, 122	159, 520
Total: 1957	209, 588	23. 9	153, 625	515, 896	15, 875	22, 122	533, 862
1956	212, 297	23. 8	156, 805	500, 557	7, 840	29, 456	518, 753
East South Central:							
Alabama	190	6. 4	--------	167, 925	2, 343	--------	165, 772
Kentucky	70, 024	23. 8	52, 788	117, 269	1, 487	582	132, 436
Mississippi	169, 967	10. 3	141, 504	119, 896	−372	452	148, 279
Tennessee	38	15. 8	--------	133, 887	3, 324	--------	130, 601
Total: 1957	240, 219	14. 2	194, 292	538, 977	6, 782	1, 034	577, 088
1956	258, 911	13. 6	211, 990	522, 377	7, 823	2, 466	559, 009
West South Central:							
Arkansas	31, 327	7. 2	569	184, 887	14, 424	−85	201, 306
Louisiana	2, 078, 901	11. 2	1, 346, 638	99, 600	−8, 546	78	840, 331
Oklahoma	719, 794	8. 3	332, 954	22, 534	15, 175	6, 922	387, 277
Texas	5, 156, 215	9. 7	2, 743, 410	137, 923	49, 379	45, 821	2, 455, 528
Total: 1957	7, 986, 237	10. 0	4, 423, 571	444, 944	70, 432	52, 736	3, 884, 442
1956	7, 594, 956	9. 3	4, 218, 450	421, 751	77, 770	2, 020	3, 718, 467
Mountain:							
Arizona	--------	--------	--------	100, 171	−5, 365	--------	105, 536
Colorado	95, 259	10. 0	58, 377	143, 661	1, 893	1, 714	176, 936
Idaho	--------	--------	--------	11, 060	327	--------	10, 733
Montana	28, 638	7. 2	3, 154	29, 494	−1, 508	4, 286	52, 200
Nevada	--------	--------	--------	8, 750	84	--------	8, 666
New Mexico	723, 004	9. 4	594, 275	116, 387	4, 308	−2, 992	243, 800
Utah	16, 824	14. 7	481	41, 474	813	--------	57, 004
Wyoming	117, 256	8. 7	72, 755	6, 836	4, 605	1, 228	45, 504
Total: 1957	980, 981	9. 4	729, 042	457, 833	5, 157	4, 236	700, 379
1956	808, 079	9. 3	529, 105	366, 643	9, 836	−892	636, 673
Pacific:							
California	492, 338	23. 7	--------	634, 451	22, 315	13, 238	1, 091, 236
Oregon	--------	--------	--------	18, 974	747	--------	18, 227
Washington	--------	--------	--------	40, 929	821	--------	40, 108
Total: 1957	492, 338	23. 7	--------	694, 354	23, 883	13, 238	1, 149, 571
1956	504, 458	22. 5	--------	562, 370	28, 501	7, 628	1, 030, 699
Total: United States							
1957	10, 680, 258	11. 3	6, 051, 485	6, 047, 771	205, 373	191. 396	10, 279, 775
1956	10, 081, 923	10. 8	5, 628, 398	5, 602, 815	212, 992	136, 470	9, 706, 878

TABLE 8.—Natural gas moving interstate, imports and exports, 1957, in million cubic feet

Consuming regions and countries or States	Quantity received	Producing regions							
		Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Foreign
New England:									
Connecticut	21,262	-------	22	-------	-------	809	20,201	-------	230
Massachusetts	58,500	-------	67	-------	-------	2,185	55,634	-------	614
New Hampshire	1,876	-------	-------	-------	-------	-------	1,876	-------	-------
Rhode Island	8,328	-------	13	-------	-------	400	7,803	-------	112
Total	89,966	-------	102	-------	-------	3,394	85,514	-------	956
Middle Atlantic:									
New Jersey	106,710	117	77	-------	49	2,581	103,162	-------	724
New York	323,238	53,856	86	-------	4,649	4,407	259,305	-------	935
Pennsylvania	443,355	2,501	501	-------	43,337	21,146	371,349	-------	4,521
Total	873,303	56,474	664	-------	48,035	28,134	733,816	-------	6,180
East North Central:									
Illinois	432,787	-------	184	35,017	-------	111	397,312	13	150
Indiana	151,380	-------	89	24,594	-------	42	126,293	11	351
Michigan	305,320	-------	10	48,965	-------	5	256,234	17	89
Ohio	578,411	14,520	306	28,269	74,008	34,450	423,535	13	3,310
Wisconsin	63,316	-------	7	1,587	-------	-------	61,722	-------	-------
Total	1,531,214	14,520	596	138,432	74,008	34,608	1,265,096	54	3,900
West North Central:									
Iowa	165,150	-------	6	59,428	-------	-------	100,412	5,304	-------
Kansas	232,036	-------	-------	323	-------	-------	225,429	6,284	-------
Minnesota	148,289	-------	-------	70,389	-------	-------	71,654	6,246	-------
Missouri	231,404	-------	-------	74,125	-------	171	156,812	6	290
Nebraska	102,967	-------	-------	52,376	-------	-------	38,654	11,937	-------
North Dakota	2,249	-------	-------	277	-------	-------	-------	1,972	-------
South Dakota	19,189	-------	-------	5,534	-------	-------	5,639	8,016	-------
Total	901,284	-------	6	262,452	-------	171	598,600	39,765	290
South Atlantic:									
Delaware	6,315	-------	-------	-------	-------	-------	6,315	-------	-------
District of Columbia	16,427	68	-------	-------	4,949	1,513	9,897		
Florida	39,012	-------	-------	-------	-------	10,488	28,524	-------	-------
Georgia	157,638	-------	-------	-------	-------	42,524	115,113	-------	1
Maryland	49,266	300	-------	-------	12,776	4,637	31,540	-------	13
North Carolina	20,580	-------	-------	-------	-------	-------	20,578	-------	2
South Carolina	40,842	-------	-------	-------	-------	7,062	33,779	-------	1
Virginia	50,920	36	-------	-------	12,706	4,448	33,730	-------	-------
West Virginia	134,896	6	4	-------	682	12,230	121,957	-------	17
Total	515,896	410	4	-------	31,113	82,902	401,433	-------	34
East South Central:									
Alabama	167,925	-------	-------	-------	-------	42,199	125,726	-------	-------
Kentucky	117,269	-------	-------	-------	468	1,193	115,292	-------	316
Mississippi	119,896	-------	-------	-------	-------	175	119,596	-------	125
Tennessee	133,887	-------	-------	-------	-------	634	132,946	-------	307
Total	538,977	-------	-------	-------	468	44,201	493,560	-------	748
West South Central:									
Arkansas	184,887	-------	-------	-------	-------	51	184,615	-------	221
Louisiana	99,600	-------	-------	-------	-------	746	98,598	-------	256
Oklahoma	22,534	-------	-------	4,384	-------	-------	18,035	115	-------
Texas	137,923	-------	-------	-------	-------	83	119,631	13,824	4,385
Total	444,944	-------	-------	4,384	-------	880	420,879	13,939	4,862
Mountain:									
Arizona	100,171	-------	-------	-------	-------	-------	57,631	42,540	-------
Colorado	143,661	-------	-------	59,333	-------	-------	53,249	31,079	-------
Idaho	11,060	-------	-------	73	-------	-------	49	10,938	-------
Montana	29,494	-------	-------	3,519	-------	-------	-------	15,657	10,318
Nevada	8,750	-------	-------	96	-------	-------	65	8,589	-------
New Mexico	116,387	-------	-------	606	-------	-------	99,203	16,578	-------
Utah	41,474	-------	-------	4	-------	-------	2	41,468	-------
Wyoming	6,836	-------	-------	1,817	-------	-------	1,187	3,832	-------
Total	457,833	-------	-------	65,448	-------	-------	211,386	170,681	10,318

TABLE 8.—Natural gas moving interstate, imports and exports, 1957, in million cubic feet—Continued

Consuming regions and countries or States	Quantity received	Producing regions							
		Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Foreign
Pacific:									
California	634,451	---	---	3,476	---	---	179,998	450,977	---
Oregon	18,974	---	---	125	---	---	84	18,765	---
Washington	40,929	---	---	200	---	---	133	29,943	10,653
Total	694,354	---	---	3,801	---	---	180,215	499,685	10,653
Total United States	6,047,771	71,404	1,372	474,517	153,624	194,290	4,390,499	724,124	37,941
Canada	30,867	94	---	3,568	1	2	24,027	3,175	---
Mexico	10,788	---	---	---	---	---	9,045	1,743	---
Total exports	41,655	94	---	3,568	1	2	33,072	4,918	---
Total	6,089,426	71,498	1,372	478,085	153,625	194,292	4,423,571	729,042	37,941

TABLE 9.—Consumption of natural gas in the United States, 1953–57, by States

State	Quantity (million cubic feet)					Change from 1956 (percent)	Estimated value at points of consumption (thousand dollars)	
	1953	1954	1955	1956	1957		1956	1957
Alabama	136,825	139,551	151,325	160,261	165,772	3.4	64,244	69,342
Arizona	71,210	75,568	88,983	105,860	105,536	−.3	36,501	39,664
Arkansas	176,489	192,378	197,374	196,297	201,306	2.6	45,966	48,163
California	862,243	933,934	1,020,395	1,021,002	1,091,236	7.9	470,301	491,385
Colorado	115,922	126,048	143,018	145,640	176,936	21.5	56,619	71,984
Connecticut	5,833	[1]11,415	14,187	18,109	20,328	12.3	26,957	27,298
Delaware	1,972	2,980	4,280	5,824	6,014	3.3	6,665	6,830
District of Columbia	13,134	14,261	15,042	15,833	15,701	−.8	21,555	21,626
Florida	19,577	23,159	26,402	35,322	38,871	10.0	9,719	11,489
Georgia	122,742	132,069	133,044	148,567	154,778	4.2	74,378	68,817
Idaho	---	---	---	765	10,733	306.7	680	4,814
Illinois	350,980	391,408	398,718	417,443	422,840	1.3	248,914	258,852
Indiana	103,444	116,308	126,897	140,135	145,179	3.6	88,988	93,769
Iowa	106,755	119,876	138,661	147,892	154,964	4.8	72,516	78,839
Kansas	283,604	293,784	309,028	324,335	343,833	6.0	88,043	93,068
Kentucky	104,781	110,039	117,496	126,580	132,436	4.6	56,685	63,097
Louisiana	594,656	636,704	774,320	839,393	840,331	−.1	141,658	150,340
Maryland	29,470	35,010	39,889	47,553	51,177	7.6	57,700	62,646
Massachusetts	17,683	35,486	43,932	50,691	56,626	11.7	87,365	98,201
Michigan	178,307	188,922	207,005	243,465	272,353	11.9	200,089	219,132
Minnesota	104,508	115,140	123,734	136,831	147,732	8.0	80,613	84,763
Mississippi	118,617	136,797	138,186	145,353	148,279	2.0	40,839	43,363
Missouri	173,674	188,349	199,272	219,424	223,528	1.9	108,319	113,510
Montana	39,934	40,624	47,491	47,690	52,200	9.5	17,560	19,269
Nebraska	83,384	93,189	102,177	109,265	116,326	6.5	50,162	52,637
Nevada	---	982	2,484	6,676	8,666	29.8	3,641	4,413
New Hampshire	857	1,065	1,206	1,445	1,787	23.7	2,449	3,499
New Jersey	58,685	65,718	74,601	90,092	100,483	11.5	132,408	146,352
New Mexico	200,039	177,221	215,281	229,821	243,800	6.1	38,443	38,705
New York	197,878	225,844	243,513	268,408	299,153	11.5	285,776	385,574
North Carolina	6,172	9,436	12,644	16,579	19,533	17.8	12,597	14,848
North Dakota	3,559	4,820	9,320	10,428	13,753	31.9	3,740	4,492
Ohio	420,809	442,523	500,865	561,557	583,753	4.0	342,638	372,545
Oklahoma	333,972	327,936	334,057	358,930	387,277	7.9	75,284	88,645
Oregon	---	---	---	4,473	18,227	307.5	5,535	13,794
Pennsylvania	335,457	353,185	390,280	431,325	445,813	3.4	304,734	324,066
Rhode Island	670	4,423	5,375	6,242	8,139	30.4	14,541	15,530
South Carolina	8,772	16,573	23,043	44,467	39,741	−10.6	19,179	19,630
South Dakota	13,688	15,564	16,107	18,002	18,251	1.4	9,153	10,147
Tennessee	106,130	114,869	118,052	126,815	130,601	3.0	54,712	58,626
Texas	2,194,172	2,198,175	2,236,540	2,323,847	2,455,528	5.7	365,873	403,127
Utah	34,592	41,073	48,903	54,669	57,004	4.3	21,227	24,055
Virginia	27,716	35,604	38,884	43,362	48,527	11.9	44,147	48,902
Washington	---	---	---	5,224	40,108	667.8	5,575	22,603
West Virginia	148,017	138,846	158,006	161,246	159,520	−1.1	67,431	69,236
Wisconsin	36,339	39,287	40,621	48,188	59,592	22.6	51,808	62,207
Wyoming	36,070	36,709	39,705	45,552	45,504	−.1	10,861	11,330
Total	7,979,338	8,402,852	9,070,343	9,706,878	10,279,775	5.9	4,024,788	4,435,224

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[1] Includes natural gas mixed with manufactured gas.

feet from Canada and Washington, 10,653 million cubic feet from Canada.

Imports from Mexico increased from only 6 million cubic feet in 1956 to 16,970 million cubic feet in 1957 as the result of opening a new pipline constructed from Mexico into Texas, where it entered the main pipeline of the Texas Eastern Transmission Corp.

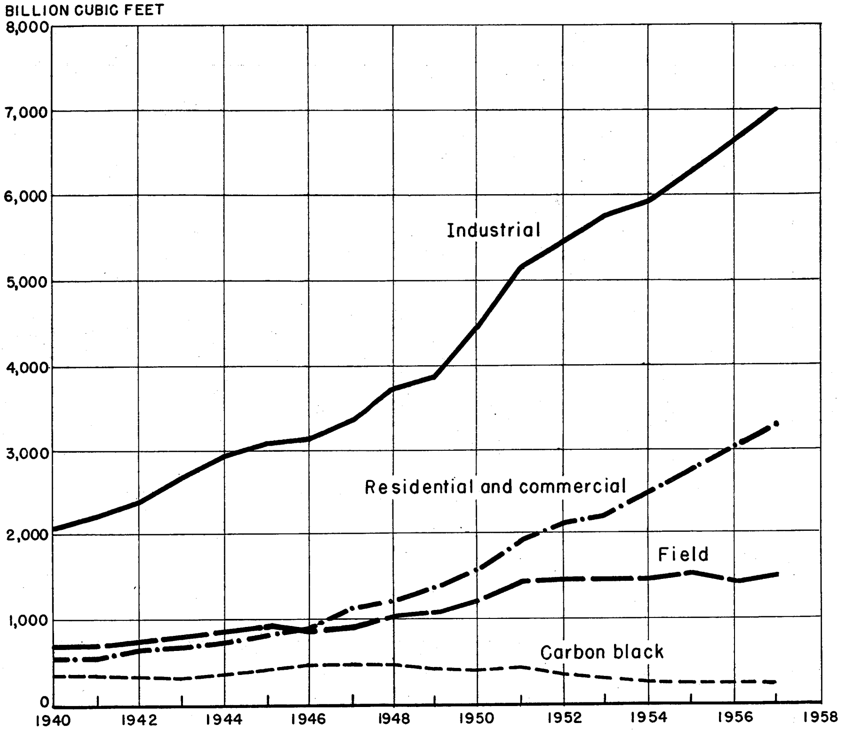

FIGURE 2.—Consumption of natural gas, by uses, in the United States, 1940–57.

PIPELINES

The total cost of construction authorized by the Federal Power Commission in 1957 was $385,506,000, compared with $548,947,000 in 1956. Construction was authorized for 3,356 miles of line requiring an estimated 672,087 net tons of steel pipe, and the installation of compressors aggregating 388,390 horsepower. When completed, these projects will add approximately 1.5 billion cubic feet daily to the capacity of existing facilities.

By the end of the year 2,771 miles, 88 percent, of the total miles of pipeline authorized by the Federal Power Commission had been placed into operation. In addition, about 78 percent of the aggregate horsepower of compressors approved was operating at the year end.

CONSUMPTION

Consumption of natural gas in the United States in 1957 increased 5.9 percent over 1956. Increases in consumption in 1957, by various classes of consumers, were: Residential, 7.4 percent; commercial, 8.2 percent; industrial fuel, 5.8 percent; and total industrial, 5.1 percent. The portland-cement industry consumed 146 billion cubic feet in 1957 or 1.4 percent more than in 1956.

TABLE 10.—Residential and commercial consumption of natural gas in the United States in 1957, by States [1]

State	Residential				Commercial				Total			
	Number of consumers (thousand)	Quantity (million cubic feet)	Value at point of consumption		Number of consumers (thousand)	Quantity (million cubic feet)	Value at point of consumption		Number of consumers (thousand)	Quantity (million cubic feet	Value at point of consumption	
			Total (thousand dollars)	Average (cents per M cubic feet)			Total (thousand dollars)	Average (cents per M cubic feet)			Total (thousand dollars)	Average (cents per M cubic feet)
Alabama	415	33,168	32,052	96.6	31	11,475	6,361	55.4	446	44,643	38,413	86.0
Arizona	228	14,215	13,802	97.1	25	7,486	3,968	53.0	253	21,701	17,770	81.9
Arkansas	249	24,092	14,679	60.9	36	12,670	5,596	44.2	285	36,762	20,275	55.2
California	3,817	301,614	228,053	75.6	298	92,450	53,647	58.0	4,115	394,064	281,700	71.5
Colorado	333	40,711	33,313	81.8	43	21,596	14,304	66.2	376	62,307	47,617	76.4
Connecticut	349	11,021	19,475	176.7	20	2,025	2,307	113.9	369	13,046	21,782	167.0
Delaware, District of Columbia, and Maryland	706	47,285	67,615	143.0	52	9,027	11,922	132.1	758	56,312	79,537	141.2
Florida	33	2,600	2,270	87.3	1	315	245	77.8	34	2,915	2,515	86.3
Georgia	360	41,223	34,469	83.6	37	15,610	8,199	52.5	397	56,833	42,668	75.1
Idaho	33	957	1,120	117.0	2	863	724	83.9	35	1,820	1,844	101.3
Illinois	1,998	154,993	158,497	102.3	108	28,329	22,759	80.3	2,106	183,322	181,256	98.9
Indiana	673	55,306	53,451	96.6	52	13,441	11,570	86.1	725	68,747	65,021	94.6
Iowa	366	49,055	41,054	83.7	39	20,353	12,166	59.8	405	69,408	53,220	76.7
Kansas	464	62,102	34,143	55.0	51	38,038	14,202	37.3	515	100,140	48,345	48.3
Kentucky	350	46,790	32,539	69.5	35	13,340	7,998	60.0	385	60,130	40,537	67.4
Louisiana	588	41,307	26,838	65.0	51	16,874	7,781	46.1	639	58,181	34,619	59.5
Massachusetts	935	31,681	69,683	220.0	53	6,896	12,642	183.3	988	38,577	82,325	213.4
Michigan	1,334	169,997	157,801	92.8	85	26,619	21,174	79.5	1,419	196,616	178,975	91.0
Minnesota	362	53,953	50,820	94.2	25	34,921	17,535	50.2	387	88,874	68,355	76.9
Mississippi	224	18,595	14,471	77.8	29	10,089	4,513	44.7	253	28,684	18,984	66.2
Missouri	723	94,986	70,126	73.8	51	21,321	14,034	65.8	774	116,307	84,160	72.4
Montana	99	16,817	9,808	58.3	11	10,172	4,206	41.3	110	26,989	14,014	51.9
Nebraska	231	33,425	25,467	76.2	30	18,990	10,652	56.1	261	52,415	36,119	68.9
Nevada	13	986	1,251	126.9	1	716	519	72.5	14	1,702	1,770	104.0
New Hampshire	30	1,174	2,435	207.4	2	330	609	184.5	32	1,504	3,044	202.4
New Jersey	1,316	54,201	115,294	212.7	89	7,334	11,633	158.6	1,405	61,535	126,927	206.3
New Mexico	136	14,702	10,779	73.3	15	7,052	3,117	44.2	151	21,754	13,896	63.9
New York	3,928	173,339	263,765	152.2	353	46,687	70,268	150.5	4,281	220,026	334,033	151.8
North Carolina	64	3,926	6,490	165.3	9	1,643	2,578	156.9	73	5,569	9,068	162.8
North Dakota	20	3,068	2,305	75.1	3	2,189	1,143	52.2	23	5,257	3,448	65.6
Ohio	1,936	313,545	225,153	71.8	156	81,610	55,091	67.5	2,092	395,155	280,244	70.9
Oklahoma	550	55,896	34,121	61.0	55	26,977	10,398	38.5	605	82,873	44,519	53.7
Oregon	7	4,577	6,907	150.9	12	1,900	2,901	152.7	19	6,477	9,808	151.4
Pennsylvania	1,956	196,550	187,762	95.5	119	42,249	32,647	77.3	2,075	238,799	220,409	92.3
Rhode Island	154	4,884	11,580	237.1	8	1,371	2,117	154.4	162	6,255	13,697	219.0

South Carolina	53	3, 109	5, 664	182. 2	8	1, 577	1, 947	123. 5	61	4, 686	7, 611	162. 4
South Dakota	48	6, 128	5, 351	87. 3	6	4, 907	2, 704	55. 1	54	11, 035	8, 055	73. 0
Tennessee	244	26, 070	22, 710	87. 1	34	16, 801	10, 171	60. 5	278	42, 871	32, 881	76. 7
Texas	2, 149	162, 148	106, 558	65. 7	189	56, 302	25, 602	45. 5	2, 338	218, 450	132, 160	60. 5
Utah	130	17, 566	11, 506	65. 5	16	7, 892	4, 024	51. 0	146	25, 458	15, 530	61. 0
Virginia	305	20, 194	31, 677	156. 9	24	7, 742	7, 919	102. 3	329	27, 936	39, 596	141. 7
Washington	74	3, 916	6, 195	158. 2	15	3, 068	4, 072	132. 7	89	6, 984	10, 267	147. 0
West Virginia	314	45, 034	27, 483	61. 0	30	13, 435	7, 240	53. 9	344	58, 469	34, 723	59. 4
Wisconsin	440	34, 112	42, 893	125. 7	29	6, 659	7, 392	111. 0	469	40, 771	50, 285	123. 3
Wyoming	55	9, 251	5, 365	58. 0	6	4, 575	1, 888	41. 3	61	13, 826	7, 253	52. 5
Total: 1957	28, 792	2, 500, 269	2, 324, 790	93. 0	2, 344	775, 916	534, 485	68. 9	31, 136	3, 276, 185	2, 859, 275	87. 3
1956	27, 887	2, 327, 564	2, 126, 114	91. 3	2, 255	716, 871	465, 478	64. 9	30, 142	3, 044, 435	2, 591, 592	85. 1

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[1] Includes natural gas mixed with manufactured gas.

TABLE 11.—Industrial consumption of natural gas in the United States, 1957, by States and uses

State	Field (pumping, drilling, and other)			Carbon black			Fuel						Total industrial			Fuel used at electric utility plants [1]
					Value at point of consumption									Value at point of consumption		
	Quantity (million cubic feet)	Value (thousand dollars)	Average value (cents per M cubic feet)	Quantity (million cubic feet)	Total (thousand dollars)	Average (cents per M cubic feet)	Refinery fuel (million cubic feet)	Natural-gas pipeline (million cubic feet)	Other industrial fuel (million cubic feet)	Total fuel (million cubic feet)	Value (thousand dollars)	Average value (cents per M cubic feet)	Quantity (million cubic feet)	Total (thousand dollars)	Average (cents per M cubic feet)	
Alabama	160	17	10.6	--------	--------	--------	--------	6,949	114,020	120,969	30,912	25.5	121,129	30,929	25.5	16,685
Arizona	16	2	12.5	--------	--------	--------	--------	11,888	71,931	83,819	21,892	26.1	83,835	21,894	26.1	35,926
Arkansas	15,454	1,354	8.8	--------	--------	--------	11,171	7,977	129,942	149,090	26,534	17.7	164,544	27,888	16.9	46,298
California	155,665	31,070	20.0	(2)	(2)	(2)	91,583	11,912	438,012	541,507	178,615	32.9	697,172	209,685	30.1	192,793
Colorado	13,888	1,214	8.7	--------	--------	--------	1,506	1,885	97,350	100,741	23,153	22.9	114,629	24,367	21.3	39,057
Connecticut	--------	--------	--------	--------	--------	--------	--------	127	7,155	7,282	5,516	75.7	7,282	5,516	75.7	2,506
Delaware, District of Columbia, and Maryland	3	1	33.3	--------	--------	--------	--------	882	15,695	16,577	11,564	69.8	16,580	11,565	69.8	2,033
Florida	34	6	17.6	--------	--------	--------	--------	--------	35,922	35,922	8,968	25.0	35,956	8,974	25.0	11,201
Georgia	--------	--------	--------	--------	--------	--------	--------	3,301	94,644	97,945	26,149	26.6	97,945	26,149	26.6	38,585
Idaho	--------	--------	--------	--------	--------	--------	--------	776	8,137	8,913	2,970	33.3	8,913	2,970	33.3	--------
Illinois	7,507	957	12.7	--------	--------	--------	8,436	11,440	212,135	232,011	76,639	33.0	239,518	77,596	32.4	53,204
Indiana	94	15	16.0	--------	--------	--------	113	7,101	69,124	76,338	28,733	37.6	76,432	28,748	37.6	8,098
Iowa	--------	--------	--------	--------	--------	--------	--------	7,331	78,225	85,556	25,619	29.9	85,556	25,619	29.9	43,839
Kansas	45,691	6,544	14.3	(2)	(2)	(2)	17,603	38,684	141,715	198,002	38,179	19.2	243,693	44,723	18.4	74,903
Kentucky	12,268	1,889	15.4	--------	--------	--------	(3)	14,543	45,495	60,038	20,671	34.4	72,306	22,560	31.2	6,065
Louisiana	160,779	18,471	11.5	26,416	2,539	9.6	101,212	21,024	472,719	594,955	94,711	15.9	782,150	115,721	14.8	78,612
Massachusetts	--------	--------	--------	--------	--------	--------	--------	619	17,430	18,049	15,876	88.0	18,049	15,876	88.0	8,333
Michigan	2,192	678	30.9	--------	--------	--------	660	2,318	70,567	73,545	39,479	53.6	75,737	40,157	53.0	591
Minnesota	--------	--------	--------	--------	--------	--------	(3)	156	58,702	58,858	16,408	27.9	58,858	16,408	27.9	41,757
Mississippi	16,777	2,180	13.0	--------	--------	--------	(3)	19,935	82,883	102,818	22,199	21.5	119,595	24,379	20.4	32,057
Missouri	706	162	22.9	--------	--------	--------	(3)	6,472	100,043	106,515	29,188	27.4	107,221	29,350	27.4	27,408
Montana	3,350	263	7.9	--------	--------	--------	2,324	361	19,176	21,861	4,992	22.8	25,211	5,255	20.8	2,970
Nebraska	3,567	466	13.1	--------	--------	--------	(3)	6,378	53,966	60,344	16,052	26.6	63,911	16,518	25.8	22,720
Nevada	--------	--------	--------	--------	--------	--------	--------	--------	6,964	6,964	2,643	38.0	6,964	2,643	38.0	4,350
New Hampshire	--------	--------	--------	--------	--------	--------	--------	--------	283	283	455	160.7	283	455	160.7	--------
New Jersey	--------	--------	--------	--------	--------	--------	--------	300	38,648	38,948	19,425	49.8	38,948	19,425	49.8	20,181
New Mexico	107,291	9,510	8.9	49,988	3,628	7.3	2,105	15,917	46,745	64,767	11,671	18.0	222,046	24,809	11.2	28,135
New York	425	272	64.0	--------	--------	--------	10	1,284	77,408	78,702	51,269	65.1	79,127	51,541	65.1	36,982
North Carolina	--------	--------	--------	--------	--------	--------	--------	1,960	12,004	13,964	5,780	41.4	13,964	5,780	41.4	--------
North Dakota	7,405	700	9.5	--------	--------	--------	(3)	279	812	1,091	344	31.5	8,496	1,044	12.3	267
Ohio	1,299	551	42.4	--------	--------	--------	4,752	6,209	176,338	187,299	91,750	48.9	188,598	92,301	48.9	3,804

Oklahoma	168,982	21,453	12.7	--------	--------	--------	40,806	8,885	85,731	135,422	22,673	16.7	304,404	44,126	14.5	68,694
Oregon	--------	--------	--------	--------	--------	--------	--------	189	11,561	11,750	3,986	33.9	11,750	3,986	33.9	556
Pennsylvania	1,802	864	47.9	--------	--------	--------	22,459	12,420	170,333	205,212	102,793	50.1	207,014	103,657	50.1	7,484
Rhode Island	--------	--------	--------	--------	--------	--------	--------	127	1,757	1,884	1,833	97.2	1,884	1,833	97.2	501
South Carolina	--------	--------	--------	--------	--------	--------	--------	982	34,073	35,055	12,019	34.2	35,055	12,019	34.2	24,035
South Dakota	--------	--------	--------	--------	--------	--------	(3)	44	7,172	7,216	2,092	28.9	7,216	2,092	28.9	3,328
Tennessee	--------	--------	--------	--------	--------	--------	--------	11,590	76,140	87,730	25,745	29.3	87,730	25,745	29.3	1,939
Texas	715,204	56,558	7.9	150,165	11,874	7.9	359,215	45,430	967,064	1,371,709	202,535	14.8	2,237,078	270,967	12.1	339,279
Utah	827	132	16.0	--------	--------	--------	1,420	25	29,274	30,719	8,393	27.3	31,546	8,525	27.0	9,861
Virginia	25	9	36.0	--------	--------	--------	--------	2,328	18,238	20,566	9,297	45.2	20,591	9,306	45.2	852
Washington	--------	--------	--------	--------	--------	--------	--------	165	32,959	33,124	12,336	37.2	33,124	12,336	37.2	--------
West Virginia	27,301	6,476	23.7	--------	--------	--------	909	7,007	65,834	73,750	28,037	38.0	101,051	34,513	34.2	1,270
Wisconsin	--------	--------	--------	--------	--------	--------	--------	417	18,404	18,821	11,922	63.3	18,821	11,922	63.3	135
Wyoming	18,227	1,861	10.2	--------	--------	--------	6,013	1,618	5,820	13,451	2,216	16.5	31,678	4,077	12.9	785
Total: 1957	[2]1,479,720	[2]162,397	11.0	[2]233,788	[2]19,319	8.3	[3]678,810	299,235	[3]4,312,037	5,290,082	1,394,233	26.4	7,003,590	1,575,949	22.5	1,338,079
1956	1,420,550	149,162	10.5	242,598	18,628	7.7	679,343	295,972	4,023,980	4,999,295	1,265,406	25.3	6,662,443	1,433,196	21.5	1,239,311

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[1] Federal Power Commission. Preliminary. Includes gas other than natural impossible to segregate and therefore shown separately.
[2] 7,219 million cubic feet and $1,278 in value included in field use to avoid disclosure; included in total carbon black.
[3] 6,513 million cubic feet included in other industrial to avoid disclosure; included in total refinery fuel; also includes gas used by portland-cement industry.

TABLE 12.—Natural gas treated at natural-gasoline and cycle plants in the United States, 1953–57, by States, in million cubic feet

States	1953	1954	1955	1956	1957
Arkansas	71,257	64,561	56,092	48,233	43,696
California	580,191	571,702	570,806	572,749	564,675
Colorado	(1)	[2] 36,169	[2] 43,911	[2] 49,052	[2] 57,759
Illinois	[3] [4] 73,157	[4] [5] 159,225	[5] 165,739	[5] 175,618	[5] 192,821
Kansas	[6] 431,998	[6] 400,791	426,533	407,749	426,454
Kentucky	[4] 277,145	[4] 370,111	[4] 389,696	[4] 406,260	[4] 396,695
Louisiana	591,626	627,006	775,761	839,274	865,836
Michigan	(3)	(5)	(5)	(5)	(5)
Mississippi	135,935	120,533	140,040	144,227	157,249
Montana	(1)	(2)	(2)	(2)	(2)
Nebraska	(6)	(6)	[6] 18,397	[6] 21,211	[6] 25,159
New Mexico	324,721	439,556	467,505	578,468	617,726
Ohio	(7)	(5)	(5)	(5)	(5)
Oklahoma	476,094	540,822	562,749	620,901	618,715
Pennsylvania	[7] 20,935	20,201	17,316	13,949	10,974
Texas	3,619,335	3,843,718	4,187,003	[8] 4,318,004	4,354,756
Utah	(1)	(2)	(2)	(2)	(2)
West Virginia	160,170	205,151	225,307	181,772	181,390
Wyoming	[1] 74,718	60,372	139,098	67,542	64,656
Total	6,837,282	7,459,918	8,185,953	[8] 8,445,009	8,578,561

[1] Colorado, Montana, and Utah included in Wyoming.
[2] Montana and Utah included in Colorado.
[3] Michigan included in Illinois.
[4] Includes gas from transmission lines; previously treated in other States.
[5] Michigan and Ohio included in Illinois.
[6] Nebraska included in Kansas in 1953; Nebraska and North Dakota included in Kansas in 1954; North Dakota included in Nebraska in 1955–57.
[7] Ohio included in Pennsylvania.
[8] Revised.

TABLE 13.—Consumption of natural gas used with manufactured gas in the United States in 1957, by States[1]

State	Residential		Commercial		Industrial	Total	
	Number of consumers (thousand)	Quantity (million cubic feet)	Number of consumers (thousand)	Quantity (million cubic feet)	Quantity (million cubic feet)	Quantity (million cubic feet)	Value at point of consumption (thousand dollars)
Connecticut	213	4,978	11	995	3,244	9,217	10,554
Illinois	926	48,387	41	10,369	24,193	82,949	63,007
Indiana	248	17,145	18	4,064	28,135	49,344	36,007
Massachusetts	291	5,560	21	1,850	2,770	10,180	21,330
New Jersey	766	18,612	7	4,840	16,088	39,540	54,743
New York	572	43,897	23	7,438	7,593	58,928	60,573
Pennsylvania	845	51,990	41	5,687	21,201	78,878	76,487
Total: 1957	3,861	190,569	162	35,243	103,224	329,036	322,701
1956[2]	4,588	207,100	312	36,625	96,306	340,031	333,177

[1] Included in tables for consumption of natural gas (tables 9–12).
[2] Revised.

VALUE AND PRICE

The average value of natural gas at the wellhead in 1957 was 11.3 cents per thousand cubic feet, a 0.5-cent increase over 1956.

The average value at the point of consumption was 43.1 cents per thousand cubic feet, an increase of 1.6 cents over 1956. The increase was reflected by all classes of consumers.

TABLE 14.—Average value of natural gas in the United States, 1956–57, by states, in cents per thousand cubic feet

State	At wells (estimated)		At point of consumption	
	1956	1957	1956	1957
Alabama	7.9	6.4	40.1	41.8
Arizona	14.0	------	34.5	37.6
Arkansas	6.0	7.2	23.4	23.9
California	22.5	23.7	46.1	45.0
Colorado	9.8	10.0	38.1	40.7
Connecticut	------	------	148.9	134.3
Delaware	------	------	114.4	113.1
District of Columbia	------	------	136.1	137.7
Florida	8.3	13.0	27.5	29.6
Georgia	------	------	50.1	44.5
Idaho	------	------	88.9	44.9
Illinois	15.1	15.5	59.6	61.2
Indiana	12.1	13.1	63.5	64.6
Iowa	------	------	49.0	50.9
Kansas	11.3	11.4	27.1	27.1
Kentucky	23.1	23.8	44.8	47.6
Louisiana	11.4	11.2	16.9	17.9
Maryland	25.3	26.2	121.3	122.4
Massachusetts	------	------	172.3	173.4
Michigan	13.3	18.8	82.2	80.5
Minnesota	------	------	58.9	57.4
Mississippi	9.8	10.3	28.1	29.2
Missouri	16.7	16.7	49.1	50.8
Montana	6.8	7.2	36.8	36.9
Nebraska	21.0	16.0	45.9	45.2
Nevada	------	------	54.5	50.9
New Hampshire	------	------	169.5	195.8
New Jersey	------	------	147.0	145.6
New Mexico	8.8	9.4	16.7	15.9
New York	28.3	28.4	106.5	128.9
North Carolina	------	------	76.0	76.0
North Dakota	8.1	9.5	35.9	32.7
Ohio	24.0	23.7	61.0	63.8
Oklahoma	8.0	8.3	21.0	22.9
Oregon	------	------	123.7	75.7
Pennsylvania	32.2	31.1	70.7	72.7
Rhode Island	------	------	233.0	190.8
South Carolina	------	------	43.1	49.4
South Dakota	------	------	50.8	55.6
Tennessee	12.9	15.8	43.1	44.9
Texas	8.7	9.7	15.7	16.4
Utah	14.1	14.7	38.8	42.2
Virginia	27.7	26.8	101.8	100.8
Washington	------	------	106.7	56.4
West Virginia	23.7	23.8	41.8	43.4
Wisconsin	------	------	107.5	104.4
Wyoming	8.6	8.7	23.8	24.9
Total	10.8	11.3	41.5	43.1

WORLD REVIEW

Marketed production of natural gas in Canada reached a new peak of 220 billion cubic feet in 1957, a 30.1-percent increase over 1956. Alberta supplied 83.2 percent of the total production in 1957 and increased production 25.3 percent to 183 billion cubic feet. Owing to construction by Westcoast Transmission Co., Ltd., marketed production of natural gas in British Columbia assumed significance for the first time.

TABLE 15.—Consumption of natural gas,[1] 1952–56, by countries, in million cubic meters

[United Nations Statistical Yearbook]

Country	1952	1953	1954	1955	1956
Western Hemisphere:					
Argentina	898	932	(2)	1,059	(2)
Barbados	4	4	3	3	2
Brazil	(2)	(2)	63	62	84
Canada	2,511	2,860	3,419	4,269	4,906
Chile	(2)	36	96	(2)	(2)
Colombia[3]	204	484	545	539	621
Ecuador[2]	------	------	------	------	------
Mexico[4]	2,649	2,675	2,666	3,412	3,534
Trinidad	478	501	515	498	547
United States	226,917	237,775	247,563	266,331	284,983
Venezuela	1,756	2,168	2,443	2,749	2,994
Europe:					
Austria	[5] 49	[5] 56	[5] 75	749	745
Czechoslovakia	(2)	(2)	172	173	274
France	266	244	259	266	319
Germany[6]	96	104	141	309	461
Hungary[3]	498	547	556	543	482
Italy	1,433	2,280	2,967	3,627	4,466
Netherlands	16	25	96	135	151
Poland[7]	313	319	358	393	434
Rumania[4]	(2)	(2)	(2)	6,307	6,916
Russia[8]	7,372	8,010	8,783	8,981	13,678
Yugoslavia	14	26	28	34	39
Asia:					
Brunei	1,094	1,173	1,098	1,177	1,428
China	28	31	29	29	30
Indonesia[4]	1,069	1,366	1,582	1,908	2,045
Japan	91	111	141	156	177
Pakistan	(2)	(2)	(2)	[9] 39	296
Africa: Morocco	(2)	4	8	(2)	7

[1] Data relate, as far as possible, to natural gas actually, collected, and used as fuel or raw material. Thus they exclude gas used for repressuring, as well as gas flared, vented, or otherwise wasted, whether or not it has first been processed for extracting natural gasoline. Natural gas is processed also in Hungary, Peru, Tunisia, and other countries.

[2] Not available.

[3] Includes gas repressured.

[4] Total production, including gas repressured and waste.

[5] Vienna only.

[6] Figures represent virtually total German production.

[7] April–December.

[8] Includes U. S. S. R. in Asia and unspecified quantity of manufactured gas.

[9] July–December.

TECHNOLOGY[1]

Economics of Liquefaction of Natural Gas.—The factors of natural-gas liquefaction are discussed in an article[2] in which investment and operating costs for (1) fixed-plant investment, (2) plant-operating costs, and (3) tanker-operating costs are analyzed. The estimates are based on plant capacities of 100 million, 250 million, and 400 million cubic feet of natural gas a day at a cost price for natural gas of 4 cents per 1,000 cubic feet. The plant must operate with a high-load factor, and under those conditions the cost of liquefaction is approximately 14 cents per 1,000 cubic feet of gas liquefied and is relatively insensitive to plant capacity.

Carbon Dioxide Removal.—An economic comparison of seven processes for removing carbon dioxide from a byproduct gas or a natural gas containing about 34 volume-percent of carbon dioxide indicated that the most economical processing scheme was hot potassium carbonate followed by aqueous monoethanolamine. The cost by this method was only slightly lower than for three of the other schemes studied.

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[1] By A. J. Kraemer.

[2] Lederman, Peter B., and Williams, Brymer, How Close Are We to Commercial Liquefaction of Natural Gas?: Oil Gas Jour., vol. 55, No. 39, Sept. 30, 1957, pp. 97–102.

The two factors primarily determining the total operating costs were steam and plant investment.[3]

Free Piston as an Aid to Gas and Liquids Production.—Use of the free piston in gas wells [4] deals with the periodic lifting of slugs of accumulated liquids from gas wells using the gas pressure. Two applications are discussed—production of gas through tubing string only and of liquid from tubing and gas from casing. Costs of free-piston installations range from $900 to $1,600 per well and are paid out in an average time of 4 months. Gas production in 1 area was increased 36 percent and liquid production, 23 percent. In addition, paraffin problems were removed.

Back-Pressure Tests.—Many State regulatory bodies require back-pressure tests on gas wells. Results of these tests usually are presented and interpreted in the form of graphs on log-log paper. Well characteristics then are calculated from such graphs, as originally described in Bureau of Mines Monograph 7.[5] Thousands of such tests are plotted each year. A rapid and accurate method, capable of solution with a desk calculator or computer, has been developed for the direct calculation of gas-well characteristics.[6] Examples are given to illustrate the utility of the method.

Deliverability of gas from underground storage.—A Bureau of Mines study [7] of two underground gas-storage projects to determine the type of tests that will give the best data on deliverability of gas from groups of wells verified earlier observations that the individual wells in a single reservoir differ in deliverability characteristics.

Generalizations derived from the data show that, for gas-storage projects in shallow reservoirs, there is little advantage in making the extensive calculations required to correct back-pressure curves to bottom-hole conditions. It is concluded that for most purposes wellhead deliverability tests are more practicable than those based on bottom-hole conditions.

Natural-Gas Dehydration.—Twenty years of experience with dehydrators for natural gas is summarized in a paper,[8] that points out that water vapor was first removed from natural gas in large volume about 25 years ago. At that time calcium chloride brine was used to remove water vapor.

About 20 years ago use of diethylene glycol began. Two or three years later activated alumina was used as a solid desiccant. Recently calcium chloride has been receiving some new attention for drying natural gas. A process employing solid calcium chloride is being used in New Mexico.

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[3] Mulloney, J. F., Which CO_2 Removal Scheme is Best?: Petrol. Ref., vol. 36, No. 12, Dec. 1957, pp. 149–152.

[4] Brown, Norman, F., Free Piston Has Quick Payout: Oil Gas Jour., vol. 55, No. 47, Nov. 25, 1957, pp. 110–114.

[5] Rawlins, E. L., and Schellhardt, M. A., Back-Pressure Data on Natural-Gas Wells and Their Application to Production Practices: Bureau of Mines Mono. 7, 1935, 210 pp.

[6] Dunning, H. N., Smith, R. W., and Walker, C. J., Non-graphical Solution of Back-Pressure Tests on Gas Wells: Petrol. Eng., vol. 30, No. 1, January 1958, pp. B–77, B–78, B–8, B–80.

[7] Walker, C. J., Corliss, E. R., Miller, J. S., and Dunning, H. N., Deliverability Texts on Gas Storage Projects: AGA, Pamphlet GSTS–57–6; AGA, Pacific Coast Gas Assoc. Conf., San Francisco, Calif., May 9, 1957. Pipeline Eng., vol. 29, No. 9, August 1957, pp. D–35/D–4, D–40; vol. 29, No. 10, September 1957, pp. D–29–D–31; vol. 30, No. 6, June 1958, pp. D–36–D–38, D–40–D–41.

[8] Swerdloff, Will, What We've Learned in 20 Years About Gas Dehydrators: Oil Gas Jour., vol. 55, No. 17, Apr. 29, 1957, pp. 122–129.

The article describes in detail the process design and operation of glycol-absorption and solid-desiccant dehydration systems for natural gas.

The natural-gas plant of Tennessee Gas Transmission Co. at Gabe, Ky., is dehydrating 950 million cubic feet of natural gas daily for low-temperature extraction of hydrocarbons.[9]

Water content is reduced from 7 pounds per million cubic feet to bone dry, and 440,000 gallons of ethane and heavier hydrocarbons are extracted per day. The article describes experience with various desiccants.

Wellhead Dehydration.—Dehydration of natural gas under the severe temperature conditions in the San Juan Basin of New Mexico, where all the gas produced is water saturated, the average frostline is 3 feet, and the gas-hydrate freezing point is 53° F., necessitates wellhead dehydration on the 500 pound-per-square-inch systems to gather and transport the gas successfully to central points for processing and delivery into the main transmission lines.[10] The article states that 1,200 packaged, skid-mounted glycol units are being operated in the San Juan Basin, ranging in capacity from one million to 50 million cubic feet of natural gas daily.

The calcium chloride dehydration units were installed as the result of experiments begun in 1955. Many improvements have been made in the short time the units have been in use.

The operation of the units is described in the article. The average dewpoint maintained in the gas-gathering system has been plus 5° F., equivalent to 4 pounds of water per million cubic feet of dry gas.

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[9] Harrell, A. G., Natural-Gas Dehydration at the Gabe, Ky., Plant of Tennessee Gas Transmission Co: Oil Gas Jour.; vol. 55, No. 43, Oct. 28, 1957, pp. 121-124.

[10] Fowler, Oliver W., Wellhead Dehydrators in the San Juan Basin: Oil Gas Jour., vol. 55, No. 17, Apr. 29, 1957, pp. 188-190.

Natural-Gas Liquids

By I. F. Avery, A. T. Coumbe, L. V. Harvey, and E. R. Eliff

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GENERAL SUMMARY

DOMESTIC production of natural-gas liquids increased slightly in 1957, largely because of the 3-percent gain in LP-gas (liquefied petroleum gas) production, which more than compensated for decreases of 6 and 15 percent in the output of finished gasoline and naphtha, respectively, and other products. Sales of LP-gases, including refinery (LR-gases) for all uses other than blending into gasoline, increased 5 percent in 1957.

SCOPE OF REPORT

Statistics on the production of natural-gas liquids were collected by the Bureau of Mines on both monthly and annual questionnaires from all natural-gasoline plants, cycling plants, and fractionators handling natural-gas liquids. Reports were not received for the liquids recovered at pipeline compressor stations and at gas-dehydration plants. Reports were received on the production of field condensate when this material was not commingled with the crude oil. Field condensate delivered to a plant and fractionated into finished products was reported as output of finished products.

The monthly reports provided information on production, stocks, and distribution. The annual reports provided facts on type of plant, production, value of production, and gas processed. Data on sales of LP-gases for fuel and chemical uses included propane, propylene, butanes, butylenes, ethane, and ethane mixtures produced at natural-gasoline plants and at petroleum refineries but did not include LP-gas that was blended into gasoline motor fuel. Information is collected on an annual questionnaire received from all producers and distributors and from 90 percent of the dealers selling over 100,000 gallons of LP-gases a year. Statistics on smaller or nonreporting dealers are indirectly included, as the sales figures of producers or distributors will reflect the operations of these dealers.

RESERVES

The American Gas Association Reserves Committee estimated the proved recoverable reserves of natural-gas liquids on December 31, 1957, at 5.69 billion barrels—a decrease of 0.21 billion barrels during the year.

The most significant changes in reserves were in New Mexico and Texas, where reserves declined 0.94 billion and 0.11 billion barrels, respectively. A number of other States reported small increases.

TABLE 1.—Salient statistics of the natural-gas-liquids industry in the United States, 1953–57, in thousand gallons

	1953	1954	1955	1956	1957
Production:					
Natural gasoline and natural-gasoline mixtures	3,858,918	[1] 4,104,828	[1] 4,457,079	[1] 4,438,890	[1] 4,499,495
LP-gases	4,692,870	5,204,304	5,972,698	6,487,413	6,655,282
Finished gasoline and naphtha	904,176	733,068	823,103	832,915	779,807
Other products	564,354	547,386	564,722	535,295	455,005
Total	10,020,318	10,589,586	11,817,602	12,294,513	12,389,589
Receipts from outside sources (refineries)	98,826	(2)	(2)	(2)	(2)
Shipments for use in gasoline:					
To refineries and jobbers	6,104,070	[2] 6,134,771	[2] 7,059,737	[2] 6,990,389	[2] 7,241,831
Exports	(3)	(3)	(3)	(3)	(3)
Losses	(3)	(3)	---	---	---
Transfers to nongasoline uses:					
LP-gases	[4] 3,717,504	[4 5] 4,132,536	[4 5] 4,549,681	[4 5] 4,796,743	[4 5] 4,915,211
Other products	177,912	200,427	220,107	207,768	181,011
Stocks at plants, terminals, and refineries:					
Natural gasoline	187,236	171,671	165,799	194,757	168,244
LP-gases	171,150	308,528	300,129	587,094	627,845
Other products	79,590	109,407	103,775	81,627	109,727
Total	437,976	589,606	569,703	863,478	905,816
Value of natural-gas liquids at plants thousand dollars	597,840	581,412	619,006	697,143	679,456
Average value per gallon cents	6.0	5.5	5.2	5.7	5.5
Natural gas processed million cubic feet	6,837,282	7,458,485	8,185,953	8,590,163	8,578,561
Average yield, all light products gallons per M cubic feet	1.47	1.42	1.44	1.43	1.44
Sales to consumers for fuel and chemical uses:					
LP-gases	3,590,067	3,785,781	4,227,711	4,528,356	4,780,141
LR-gases [6]	1,341,942	1,339,752	1,768,772	2,107,407	2,158,980
Total	4,932,009	5,125,533	[7] 5,996,483	[7] 6,635,763	[7] 6,939,121
Exports of natural gasoline, LP-gases, and LR-gases	164,557	189,216	183,155	187,882	192,505

[1] Includes isopentane. Isopentane included in LP-gases in previous years.

[2] "Receipts from outside sources" has been eliminated from supply and shipments.

[3] Natural gasoline exports and losses included in "Shipments for use in gasoline: To refineries and jobbers."

[4] Includes ethane.

[5] Includes LP-gas exports.

[6] Liquefied refinery gases.

[7] Ethane is excluded from "Sales to consumers for fuel and chemical uses" before 1955.

TABLE 2.—Estimated proved recoverable reserves of natural-gas liquids [1] in the United States, 1956–57, in thousand barrels

[Committee on Natural Gas Reserves, American Gas Association]

State	Reserves as of Dec. 31, 1956	Changes in reserves during 1957			Reserves as of Dec. 31, 1957			
		Extensions and revisions	Discoveries of new fields and new pools in old fields	Net production	Nonassociated with oil	Associated with oil	Dissolved in oil	Total
Arkansas	42,467	−2,501	89	2,915	4,503	21,152	11,485	37,140
California [2]	311,728	23,085	585	29,669	----------	93,882	211,847	305,729
Colorado	11,545	173	80	833	2,304	683	7,978	10,965
Illinois	16,772	−3,255	----------	1,724	27	11,763	3	11,793
Indiana	133	−3	5	21	9	97	8	114
Kansas	171,615	21,698	2,191	6,349	180,837	4,617	3,701	189,155
Kentucky	7,251	275	138	1,957	[3] 5,707	----------	----------	5,707
Louisiana [2]	1,014,942	−10,580	61,895	47,059	794,152	189,390	35,656	1,019,198
Michigan	1,068	246	19	96	425	114	698	1,237
Mississippi	56,003	1,016	398	3,016	29,388	19,403	5,610	54,401
Montana	8,145	−13	----------	327	----------	----------	7,805	7,805
Nebraska	6,504	1,364	78	811	5,152	754	1,229	7,135
New Mexico	414,099	−82,570	4,343	15,324	205,372	45,168	70,008	320,548
North Dakota	19,000	----------	5,000	1,300	5,000	----------	17,700	22,700
Ohio	1,669	144	16	19	[3] 1,810	----------	----------	1,810
Oklahoma	355,588	7,334	13,818	34,097	100,176	62,960	179,507	342,643
Pennsylvania	3,167	261	131	99	[3] 3,460	----------	----------	3,460
Texas [2]	3,379,889	51,756	38,955	198,983	1,329,865	594,705	1,347,047	3,271,617
Utah	95	----------	----------	4	91	----------	----------	91
West Virginia	26,741	798	266	4,893	22,912	----------	----------	22,912
Wyoming	53,874	−346	501	2,864	15,038	763	35,364	51,165
Alabama, Florida, and Missouri	37	2	----------	4	18	----------	17	35
Total	5,902,332	8,884	128,508	352,364	2,706,246	1,045,451	1,935,663	5,687,360

[1] Comprises natural gasoline, LP-gases, and condensate.
[2] Includes offshore reserves.
[3] Not allocated by types, but occurring principally in column above.

PRODUCTION

The production of natural-gas liquids increased less than 1 percent in 1957. Production of LP-gas and natural gasoline increased 3 and 1 percent, respectively. Output of finished gasoline and naphtha, and other products decreased. The production of liquefied refinery gas (LR-gas) by States, for fuel and chemical uses is included for the first time in table 9.

TABLE 3.—Natural-gas liquids produced and natural gas treated in the United States, 1957, by States

State	Number of operators[3]	Production												
		Natural gasoline[1]		LP-gases		Finished gasoline and naphtha		Other products[2]		Total		Natural gas treated		
													Average yield (gallons per M cubic feet)	
		Thousand gallons	Thousand dollars	Thousand gallons	Thousand dollars	Thousand gallons	Thousand dollars	Thousand gallons	Thousand dollars	Thousand gallons	Thousand dollars	Million cubic feet	Natural-gas liquids except LP-gases	All natural-gas liquids
Arkansas	8	37,159	2,027	54,034	2,097	2,070	239	640	47	93,903	4,410	43,696	0.91	2.15
California	25	791,447	76,630	390 743	20,421	----------	----------	51,931	4,725	1,234,121	101,776	564,675	1.49	2.19
Colorado[4]	10	55,352	2,758	73,911	3,785	----------	----------	104	8	129,367	6,551	57,759	.96	2.24
Illinois[5]	6	24,026	1.697	364,635	15,549	1,927	251	----------	----------	390,588	17,497	192,821	.13	2.03
Kansas	12	119,079	6,557	103,494	4,042	----------	----------	168	12	222,741	10,611	426,454	.28	.52
Kentucky	5	34,737	1,921	176,033	7,403	----------	----------	219	14	210,989	9,338	[6] 396,695	.09	.53
Louisiana	33	300,135	20,406	335,142	14,888	306,875	28,911	167,999	14,639	1,110,151	78,844	865,836	.90	1.28
Mississippi	2	17,403	1,086	10,044	472	----------	----------	7,749	383	35,196	1,941	157,249	.16	.22
Nebraska[7]	4	20,002	1,544	57,615	3,305	----------	----------	----------	----------	77,617	4,849	25,159	.80	3.09
New Mexico	10	308,574	19,909	375,930	13,046	----------	----------	436	32	684 940	32,987	617,726	.50	1.11
Oklahoma	39	458 192	25,014	587,140	21,824	2,231	301	221	14	1,047,784	47,153	618,715	.74	1.69
Pennsylvania	6	3,106	192	1,211	106	----------	----------	----------	----------	4,317	298	10,974	.28	.39
Texas	103	2,256,585	141,494	3,831,664	147,618	466,277	42,393	221,519	17,536	6,776,045	349,041	4,354,756	.68	1.56
West Virginia	8	29,840	2,114	235,881	6,543	427	59	168	12	266.316	8,728	181,390	.17	1.47
Wyoming	8	43,858	2,588	57,805	2,566	----------	----------	3,851	278	105,514	5,432	64,656	.74	1.63
Total	197	4,499,495	305,937	6,655,282	263.665	779,807	72,154	455,005	37,700	12,389,589	679,456	8,578,561	.67	1.44

[1] Includes isopentane.

[2] Includes condensate, kerosine, distillate fuel, etc.

[3] A producer operating in more than 1 State is counted but once in arriving at total for United States.

[4] Montana (2 operators) and Utah (1 operator) included in Colorado.

[5] Michigan and Ohio (2 operators each) included in Illinois.

[6] Includes gas from transmission lines, previously treated in another State.

[7] North Dakota (1 operator) included in Nebraska.

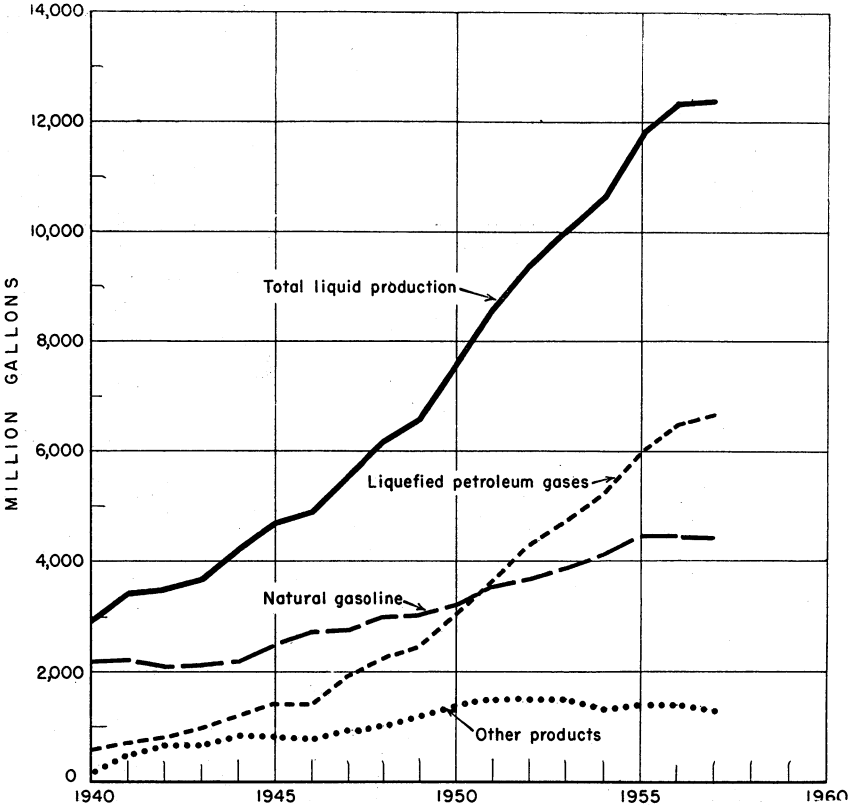

FIGURE 1.—Production of the natural-gas-liquids industry in the United States 1940–57.

TABLE 4.—Monthly production of natural-gas liquids in the United States, 1957, by States and districts,[1] in thousand gallons

State and district	January	February	March	April	May	June	July	August	September	October	November	December	Total
West Pennsylvania	544	554	530	482	401	244	219	223	158	229	350	383	4, 317
West Virginia	20, 190	24, 892	23, 794	26, 111	24, 968	19, 463	18, 957	20, 461	20, 709	21, 657	23, 242	21, 872	266, 316
Illinois, Michigan, and Ohio	31, 501	31, 267	33, 338	33, 846	29, 032	30, 807	31, 689	32, 630	31, 453	32, 952	36, 790	35, 283	390, 588
Kentucky	19, 968	18, 351	20, 701	19, 403	19, 745	18, 112	15, 445	15, 190	14, 766	14, 680	18, 747	15, 881	210, 989
Kansas	22, 891	21, 178	21, 748	19, 834	15, 609	13, 853	13, 642	14, 712	15, 772	17, 910	22, 526	23, 066	222, 741
Nebraska and North Dakota	6, 935	6, 823	6, 657	5, 448	6, 125	5, 760	5, 893	5, 792	5, 546	6, 787	7, 181	8, 670	77, 617
Oklahoma	93, 238	84, 485	89, 079	87, 558	83, 754	80, 791	82, 700	85, 458	84, 686	89, 907	92, 504	93, 624	1, 047, 784
Texas:													
Gulf	131, 203	118, 221	128, 408	131, 811	140, 290	115, 620	117, 492	120, 755	121, 976	128, 943	135, 528	126, 238	1, 516, 485
East Texas	28, 086	26, 728	33, 476	26, 560	30, 830	28, 729	27, 102	26, 753	26, 506	23, 627	21, 981	21, 791	322, 169
Panhandle	93, 785	84, 618	92, 289	89, 091	84, 632	77, 018	38, 585	80, 873	81, 351	89, 694	92, 325	96, 230	1, 000, 491
West Texas	184, 275	177, 408	188, 600	183, 446	205, 764	193, 388	196, 355	206, 806	193, 750	191, 627	177, 679	192, 488	2, 291, 586
Rest of State	149, 504	132, 874	147, 004	138, 327	134, 960	128, 796	134, 667	135, 742	132, 631	140, 779	134, 716	135, 314	1, 645, 314
Total Texas	586, 853	539, 849	589, 777	569, 235	596, 476	543, 551	514, 201	570, 929	556, 214	574, 670	562, 229	572, 061	6, 776, 045
Arkansas	8, 057	7, 237	7, 784	7, 299	7, 281	8, 506	8, 232	8, 184	7, 939	8, 159	7, 455	7, 770	93, 903
Louisiana:													
Gulf	53, 915	46, 324	49, 399	48, 159	48, 266	44, 880	48, 769	49, 287	45, 914	46, 911	49, 249	55, 493	586, 566
Inland	46, 325	42, 770	49, 052	43, 082	44, 157	41, 679	40, 871	41, 154	40, 649	45, 165	43, 464	45, 217	523, 585
Total Louisiana	100, 240	89, 094	98, 451	91, 241	92, 423	86, 559	89, 640	90, 441	86, 563	92, 076	92, 713	100, 710	1, 110, 151
Mississippi	3, 131	2, 945	3, 194	3, 006	2, 945	2, 762	2, 772	2, 895	2, 737	2, 831	2, 805	3, 173	35, 196
New Mexico	55, 344	51, 088	56, 693	55, 148	56, 464	53, 885	57, 890	59, 291	58, 444	61, 737	59, 560	59, 396	684, 940
Colorado, Montana, and Utah	10, 459	9, 608	10, 150	10, 202	10, 574	10, 201	10, 254	11, 155	11, 147	11, 807	11, 419	12, 391	129, 367
Wyoming	9, 005	8, 438	8, 763	8, 108	8, 594	7, 879	8, 330	8, 734	9, 237	9, 691	9, 002	9, 733	105, 514
California	111, 486	100, 055	104, 333	99, 019	101, 977	97, 744	100, 277	101, 424	98, 644	105, 511	105, 465	108, 186	1, 234, 121
Total United States	1, 079, 842	995, 864	1, 074, 992	1, 035, 940	1, 056, 368	980, 117	960, 141	1, 027, 519	1, 004, 015	1, 050, 604	1, 051, 988	1, 072, 199	12, 389, 589
Daily average	34, 834	35, 567	34, 677	34, 531	34, 076	32, 671	30, 972	33, 146	33, 467	33, 890	35, 066	34, 587	33, 944

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[1] West Pennsylvania separated from eastern part of State to allow grouping either in a Bureau of Mines refinery district or Petroleum Administration for War district. Districts shown for Texas and Louisiana are Bureau of Mines production districts.

YIELD, PROCESSES, AND NUMBER OF PLANTS

The overall yield of natural-gas liquids recovered in 1957 remained at about the 1956 level. The number of plants operating at the end of 1957 totaled 559. Compression plants decreased by 22 in 1957, but the number of absorption and cycling plants increased by 10 and 3, respectively. Eleven compression and 5 refrigeration plants changed to combination plants in 1957. Texas produced 55 percent of the natural-gas liquids at 231 plants. The average daily output capacity as of January 1, 1958, was 2,123,902 gallons per day, 5 percent over January 1, 1956. The capacity of fractionating equipment increased 13 percent during the same period.

TABLE 5.—Natural-gas liquids produced in the United States in 1957, by States and by methods of manufacture

State	Number of plants operating				Production (thousand gallons)			
	Compression [1]	Absorption [2]	Cycling [3]	Total	Compression	Absorption	Cycling	Total
Arkansas	----------	7	1	8	----------	(4)	(4)	93,903
California	2	68	3	73	2,239	1,083,878	148,004	1,234,121
Colorado [5]	2	11	1	14	(4)	(4)	(4)	[6] 129,367
Illinois [7]	2	6	----------	8	450	390,138	----------	390,588
Kansas	2	15	----------	17	5,996	216,745	----------	222,741
Kentucky	1	4	----------	5	(4)	(4)	----------	210,989
Louisiana	3	36	12	51	6,148	[6] 475,147	628,856	1,110,151
Mississippi	----------	1	2	3	----------	(4)	(4)	35,196
Nebraska [8]	----------	5	----------	5	----------	77,617	----------	77,617
New Mexico	2	18	----------	20	13,349	671,591	----------	684,940
Oklahoma	8	60	2	70	18,031	909,755	119,998	1,047,784
Pennsylvania	5	5	----------	10	254	4,063	----------	4,317
Texas	18	183	30	231	236,403	[6] 5,366,871	1,172,771	6,776,045
West Virginia	27	7	----------	34	185,755	[6] 80,561	----------	266,316
Wyoming	1	9	----------	10	(4)	(4)	----------	105,514
Total: 1957	73	435	51	559	526,293	9,740,581	2,122,715	12,389,589
1956	95	425	48	568	851,152	9,283,566	2,159,795	12,294,513

[1] Includes 28 plants manufacturing LP-gases; 1 refrigeration-type plant each in California, Colorado, and Kansas; 2 refrigeration-type plants in New Mexico; and 6 refrigeration-type plants in Texas.
[2] Includes combination of absorption with compression process. Includes 307 plants manufacturing LP-gases.
[3] Includes 43 plants manufacturing LP-gases.
[4] Included in State total production and United States total production to avoid disclosing individual company operations.
[5] Montana (2 absorption plants) and Utah (a small quantity of drip gasoline) included in Colorado.
[6] Includes some drip gasoline.
[7] Michigan (2 compression plants) and Ohio (1 absorption plant) included in Illinois.
[8] North Dakota (1 absorption plant) included in Nebraska.

SHIPMENTS OF NATURAL-GAS LIQUIDS FROM PLANTS AND TERMINALS

Shipments of natural-gas liquids from plants and terminals increased 3 percent in 1957.

For Motor-Fuel Use.—Total natural-gas liquids shipped for blending into motor-fuel increased 4 percent in 1957. The proportion of natural-gas liquids in refinery gasoline increased from 10.0 percent in 1956 to 10.6 percent in 1957. In the Louisiana Gulf Coast area the increase was from 9.4 percent in 1956 to 17.6 percent in 1957.

For Non-Motor-Fuel Uses.—Shipments of LP-gases (excluding isobutane from natural-gasoline plants and terminals) for fuel and chemical use continued its upward trend, increasing 2 percent in 1957. For a discussion of sales of LP-gases for fuel and chemical uses see page 10.

TABLE 6.—Supply and distribution at plants and terminals[1] of natural-gas liquids in the United States, 1957, by months, in thousand gallons

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Production:													
Natural gasoline and natural-gasoline mixtures	355,664	343,179	387,597	379,549	386,581	385,753	357,336	412,213	363,976	361,441	341,463	349,264	4,424,016
LP-gases:													
Propane	293,857	258,056	264,402	242,806	253,814	221,562	219,370	243,435	253,552	282,506	292,451	305,394	3,131,205
Butane, normal	129,961	120,353	123,879	121,992	141,340	116,312	112,867	117,698	131,116	139,497	144,647	136,052	1,535,714
Isobutane	37,958	33,919	38,457	35,484	38,452	37,131	37,173	34,234	38,397	42,556	42,469	46,009	462,239
Butane-propane mixture	72,661	64,718	72,582	75,391	61,723	60,941	73,323	74,191	62,805	63,542	61,279	63,501	806,657
Other LP-gas mixtures	70,985	71,204	72,684	72,750	66,714	56,609	50,208	38,042	52,179	50,265	61,342	56,485	719,467
Isopentane	6,538	6,079	6,982	6,613	6,193	6,167	7,417	4,874	5,034	5,686	6,593	7,303	75,479
Finished gasoline and naphtha	69,698	63,047	68,349	64,169	64,922	62,765	65,018	64,502	63,477	67,290	63,085	63,485	779,807
Condensate, raw	26,854	21,592	23,710	21,946	20,764	18,020	21,560	21,887	18,890	23,913	25,078	30,312	274,526
Other products	15,666	13,717	16,350	15,240	15,865	14,857	15,869	16,443	14,589	13,908	13,581	14,394	180,479
Total	1,079,842	995,864	1.074,992	1,035,940	1,056,368	980,117	960,141	1,027,519	1,004,015	1,050,604	1,051,988	1,072,199	12,389,589
Stock change at plants and terminals	−121,361	−4,134	54,450	66,558	161,148	104,391	46,802	26,845	24,772	−40,410	−95,346	−172,179	51,536
Shipments:													
For use in gasoline:													
Natural gasoline and natural-gasoline mixtures	346,493	340,997	396,985	378,934	375,668	384,276	373,958	427,200	364,263	352,203	345,162	355,366	724931 4,441,505
LP-gases:													
Propane	2,814	2,604	1,974	3,612	6,048	3,822	1,554	3,192	5,460	2,982	3,864	3,780	41,706
Butane, normal	89 034	63,345	50,364	54,904	49,239	53,127	60,141	77,772	84,311	100,275	116,030	112,842	911,384
Isobutane	36,169	32,009	33,683	31,288	37.862	34,870	35,387	30,207	33,748	41,912	37,633	41,422	426,190
Butane-propane mixture	4,032	1,386	3,654	4,242	3,780	3,822	1,890	2,520	2,478	1,680	4,032	2,772	36,288
Other LP-gas mixtures	22,218	28,728	38,262	35,742	36,834	39.270	30,618	24,822	3,360	6,174	7,098	7,056	280,182
Isopentane	7,063	5,290	5,831	6,353	5,838	6,127	6,359	7,372	5,652	5,771	5,376	5,879	72,911
Finished gasoline and naphtha	64,763	58,097	74,101	68,619	64,528	63,834	63,784	62.747	61,371	66,175	57,429	62,454	767,902
Condensate	24,069	21,496	21,837	21,460	22,166	19,715	21,053	23,764	19,569	22,128	22,[illegible]42	23,964	263,763
For other uses:													
LP-gases:[2]													
Propane	417.695	299,506	223,388	201,910	137.146	137,922	185,899	199,705	217,122	276,170	344,622	430,333	3,071,418
Butane, normal	49,372	27,917	44,858	37,783	59,911	40,765	27,567	47,978	54,223	85,308	73,065	63,882	612,629
Isobutane[3]	2,267	2.007	2,112	1,961	2,375	2,186	2,219	1,893	2,116	2,628	2,360	2,597	26,721
Butane-propane mixture	71,551	56,481	71,334	70,893	48,770	54,451	68,798	65,417	59,538	70,151	59,884	67,660	764,928
Other LP-gas mixtures	47,085	42,108	36,807	37,304	28,808	18,106	19,672	8,715	52,900	44,161	54,288	49,561	439,515
Other products	16,578	18,027	15,352	14,377	16,247	13,433	14,440	17,370	13,132	13,296	13,949	14,810	181,011
Total demand at plants and terminals	1,201,203	999.998	1,020,542	969,382	895,220	875,726	913,339	1,000,674	979,243	1,091,014	1,147,334	1,244,378	12,338,053

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[1] Terminals owned by producers.

[2] Includes LP-gas exports.

[3] Reported on LP-gas sales report for chemical and synthetic rubber use.

TABLE 7.—Natural-gas liquids utilized at refineries in the United States, 1957, by Bureau of Mines refinery districts and by months, in thousand gallons

District	January	February	March	April	May	June	July	August	September	October	November	December	Total
East Coast	11,046	10,710	9,450	5,208	5,208	6,006	6,636	10,752	5,880	7,896	9,408	7,518	95,718
Appalachian	42	42	42	------	------	------	------	------	------	------	------	210	336
Indiana, Illinois, Kentucky, etc	57,750	39,438	40.530	45,066	42,336	40,908	41,286	57,498	54,222	67,578	58,590	58,422	603,624
Minnesota, Wisconsin, North Dakota, and South Dakota	714	588	756	462	840	756	924	1,638	966	882	630	882	10,038
Oklahoma, Kansas, Missouri	49,476	42,714	45,234	42,630	38,892	40,698	50,652	52,584	51,996	56,028	58,758	55,776	585,438
Texas:													
Gulf Coast	140,994	132,384	140,112	137,424	138,936	137,130	146,328	167,832	157,542	154,896	162,876	153,846	1,770,300
Inland	83,370	66,024	96,558	86,310	89,838	88,284	97,062	95,088	92,442	94,668	83,412	92,022	1,065,078
Total Texas	224,364	198,408	236,670	223,734	228,774	225,414	243,390	262,920	249,984	249,564	246,288	245,868	2,835,378
Louisiana-Arkansas:													
Louisiana Gulf Coast	82,950	75,012	77,238	74,256	89,376	65,814	76,440	66,906	83,496	76,188	83,160	86,604	937,440
Arkansas, Louisiana Inland	2,940	2,646	1,848	1,722	1,554	1,890	1,890	1,932	1,764	2,226	1,932	2,058	24,402
Total Louisiana-Arkansas	85,890	77,658	79,086	75,978	90,930	67,704	78,330	68,838	85,260	78,414	85,092	88,662	961,842
Rocky Mountain	12,852	11,340	10,416	12,432	8,946	8,232	8,946	8,778	11,550	12,516	11,760	9,954	127,722
West Coast	91,350	80,010	94,248	91,602	94,710	93,534	91,224	90,174	94,248	90,930	84,882	86,772	1,083,684
Total United States	533,484	460,908	516,432	497,112	510,636	483,252	521,388	553,182	554,106	563,808	555,408	554,064	6,303,780

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TABLE 8.—Percentage of natural-gas liquids in refinery gasoline [1] in the United States, 1953–57, by Bureau of Mines refinery districts

Year	East Coast	Appalachian	Indiana, Illinois, Kentucky, etc.	Minnesota-Wisconsin, North Dakota, and South Dakota	Oklahoma, Kansas, Missouri	Texas Inland	Texas Gulf Coast	Louisiana Gulf Coast	Arkansas, Louisiana Inland	Rocky Mountain	California	Total
1953	2.3	0.3	5.2	(2)	8.6	25.7	10.7	5.5	9.4	5.6	16.9	9.0
1954	2.8	.7	5.2	(2)	9.4	[3]31.1	10.2	6.5	7.0	5.8	18.2	9.5
1955	1.9	.8	5.8	(2)	9.7	33.8	10.2	5.9	5.4	5.5	16.6	9.5
1956	1.4	.3	5.8	1.5	10.1	34.5	10.9	9.4	4.7	5.1	15.1	10.0
1957	1.3	(4)	5.6	1.5	9.7	34.3	12.7	17.6	4.6	5.8	14.0	10.6

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[1] Refinery gasoline excludes jet fuel.

[2] Minnesota, Wisconsin, North Dakota, and South Dakota district not shown separately before 1956.

[3] Revised.

[4] Less than 0.05 percent.

TABLE 9.—Liquefied petroleum gas produced at refineries in 1957, in thousand gallons

States	Propane	Butane-propane mixture	Butane	Other LP-gas	Total
East Coast	238,056	--------	40,026	--------	278,082
Western New York	7,350	--------	--------	126	7,476
Western Pennsylvania	252	--------	--------	--------	252
West Virginia	--------	--------	--------	1,554	1,554
Illinois	[1] 101,682	[1] −420	[1] 15,540	--------	[1] 116,802
Kansas	36,792	5,250	16,338	420	58,800
Kentucky	(1)	(1)	(1)	--------	(1)
Michigan	(1)	(1)	(1)	--------	(1)
Ohio	83,496	--------	18,690	--------	102,186
Oklahoma	51,366	13,230	15,918	47,250	127,764
Arkansas	12,012	4,242	378	966	17,598
Louisiana:					
Gulf	124,278	21,126	60,522	236,586	442,512
Inland	--------	--------	--------	--------	--------
Mississippi	--------	--------	--------	--------	--------
New Mexico	378	--------	2,688	--------	3,066
Texas	329,280	14,826	351,120	89,586	784,812
Gulf	266,826	14,826	319,242	72,408	673,302
West Texas	18,312	--------	11,928	1,302	31,542
East Texas	--------	--------	--------	--------	--------
Panhandle	35,070	--------	20,664	--------	55,734
Other	9,072	--------	−714	15,876	24,234
Colorado	(2)	--------	--------	(2)	(2)
Montana	(2)	--------	--------	(2)	(2)
Nebraska	[3] 10,794	--------	--------	--------	[3] 10,794
Utah	(2)	--------	--------	--------	--------
Wyoming	[2] 19,950	[2] 42	1,722	[2] 210	[2] 21,924
California	188,412	6,972	60,018	15,330	270,732
Total	1,204,098	65,268	582,960	392,028	2,244,354

[1] Kentucky, Michigan, Indiana, Minnesota, and Tennessee, included with Illinois.
[2] Colorado, Montana, and Utah, included with Wyoming.
[3] Iowa, Missouri, and North Dakota, included with Nebraska.

SALES OF LIQUEFIED PETROLEUM GASES [1]

Domestic sales of liquefied petroleum gases increased 5 percent in 1957 compared with 8 percent in 1956, according to a survey made by the Bureau of Mines, United States Department of the Interior. Exports in 1957, as reported by the Bureau of Census, were 6 percent above those of 1956.

The gain in the domestic and commercial use of LP-gases was much lower for the year (2 percent for 1957, compared with 7 percent in 1956). Deliveries to chemical plants for use as raw material and solvents were 8 percent higher in 1957 compared with a 7-percent gain in 1956.

Sales of LP-gases for synthetic rubber components remained the same the preceding year; the gain for 1956 was 3 percent over 1955 requirements. LP-gases sold for internal-combustion engine fuel increased 4 percent in 1957; in the years, 1955 and 1956, gains of 19 percent were shown for this use. LP-gas sales to industrial plants for fuel increased less than 1 percent in 1957 compared with 4 percent in 1956.

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[1] LP-gases, as used in this section, include LR-(liquid-refinery) gases.
The survey covering sales of LP-gases in the Pacific coast marketing area (district 5) was made by F. A. Moore, Branch of Petroleum Economics, Region II, Bureau of Mines, San Francisco, California.

Requirements for LP-gases by gas companies in 1957 were 9 percent over the 1956 total, which in turn was 1 percent below the demand in 1955. LP-gases used as fuel at petroleum refineries in 1957 were 14 percent below the 1956 total, apparently because crude runs to stills were lower. LP-gases are used for secondary recovery of crude petroleum in some oilfields. Data on this use were collected for the first time in the 1957 survey. The quantity injected into oil wells in 1957 is published in this report to cover more completely all requirements for liquefied gases.

TABLE 10.—Sales of LP-gases [1] in the United States, 1953–57, in thousand gallons

Year	Butane	Percent of total	Propane	Percent of total	Butane-propane mixture	Percent of total	All other mixtures	Percent of total	Total LP-gas	Total percent	Percent increase
1953	671, 320	13. 6	2, 832, 495	57. 4	1, 428, 194	29. 0	(2)	------	4, 932, 009	100. 0	10. 2
1954	765, 826	14. 9	2, 968, 312	57. 9	1, 391, 395	27. 2	(2)	------	5, 125, 533	100. 0	3. 9
1955	724, 334	11. 8	3, 260, 571	53. 3	1, 428, 938	23. 3	708, 875	11. 6	6, 122, 718	100. 0	19. 5
1956	888, 545	13. 4	3, 626, 189	54. 6	1, 160, 017	17. 5	[3] 961, 012	14. 5	6, 635, 763	100. 0	8. 4
1957	1, 117, 748	16. 1	4, 009, 144	57. 8	934, 183	13. 5	[4] 878, 046	12. 6	6, 939, 121	100. 0	4. 6

[1] Data include LR-gases.
[2] Not reported separately before 1955.
[3] Includes 36,088,000 gallons of isobutane.
[4] Includes 26,721,000 gallons of isobutane.

TABLE 11.—Sales of LP-gases [1] in the United States, 1953–57, by uses, in thousand gallons

Year	Domestic and commercial	Chemical	Synthetic rubber	Internal combustion	Industrial	Refinery fuel	Gas manufacture	Used in the secondary recovery of petroleum	All other	Total
1953	2, 479, 180	967, 427	390, 501	498, 238	348, 517	(2)	222, 430	(3)	25, 716	4, 932, 009
1954	2, 626, 808	1, 050, 239	307, 735	547, 204	375, 121	(2)	191, 932	(3)	26, 494	5, 125, 533
1955	2, 801, 379	1, 493, 177	406, 210	651, 821	423, 431	101, 033	213, 760	(3)	31, 907	6, 122, 718
1956	3, 001, 021	[4] 1. 600, 604	418, 101	773, 471	[4] 438, 916	142, 590	212, 293	(3)	48, 767	6, 635, 763
1957	3, 067, 070	1, 732. 338	418, 189	805, 056	441, 474	122, 405	231, 155	68, 557	52, 877	6, 939, 121

[1] Data include LR-gases.
[2] Not reported separately before 1955.
[3] Not reported separately before 1957.
[4] Revised.

TABLE 12.—Sales of LP-gases[1] in the United States, 1956–57, by districts and States, in thousand gallons

District[2] and State	Domestic and commercial		Gas manufacturing		Industrial		Synthetic rubber	
	1956	1957	1956	1957	1956	1957	1956	1957
District 1:								
Connecticut	23,845	25,649	479	491	13,112	13,301	--------	--------
Delaware	7,687	9,474	807	1,019	4,685	4,691	--------	--------
Florida	112,922	107,681	21,728	28,641	6,197	6,303	--------	--------
Georgia	73,411	69,422	9,928	13,317	6,079	6,123	--------	--------
Maine	16,295	18,672	1,204	1,085	1,251	1,221	--------	--------
Maryland and District of Columbia	28,567	30,702	5,821	6,562	2,950	2,956	--------	--------
Massachusetts	31,251	33,287	3,041	2,615	3,385	3,459	--------	--------
New Hampshire	12,047	13,045	2,049	1,864	1,189	1,103	--------	--------
New Jersey	33,996	35,384	5,053	4,757	22,124	22,099	--------	--------
New York	77,184	80,696	6,620	5,817	10,173	10,166	--------	--------
North Carolina	63,349	64,173	13,573	12,592	3,357	3,445	--------	--------
Pennsylvania	48,126	50,525	9,828	9,782	40,880	41,046	--------	--------
Rhode Island	5,576	6,775	154	139	610	613	--------	--------
South Carolina	42,370	43,348	3,901	3,762	6,096	6,195	--------	--------
Vermont	10,763	10,972	2,503	2,341	952	921	--------	--------
Virginia	37,523	39,125	1,385	1,334	3,557	4,322	--------	--------
West Virginia	6,047	6,241	107	102	4,575	5,156	--------	--------
Total	630,959	645,171	88,181	96,220	[3] 164,000	[3] 174,596	--------	--------
District 2:								
Illinois	147,684	158,091	10,836	16,445	33,900	34,639	--------	--------
Indiana	84,758	88,728	8,722	10,177	24,556	25,284	--------	--------
Iowa	84,962	87,741	6,322	6,314	9,501	9,740	--------	--------
Kansas	133,860	138,711	15	16	3,441	3,640	--------	--------
Kentucky	47,887	50,722	--------	--------	1,103	2,694	--------	--------
Michigan	59,714	62,892	4,011	4,342	20,737	20,841	--------	--------
Minnesota	88,627	94,623	7,516	7,254	11,724	12,137	--------	--------
Missouri	129,736	136,088	6,459	6,702	7,433	7,550	--------	--------
Nebraska	65,845	69,038	1,884	1,653	4,186	4,422	--------	--------
North Dakota	32,305	33,431	2,794	2,612	1,564	1,617	--------	--------
Ohio	44,320	46,818	3,849	3,437	12,387	12,157	--------	--------
Oklahoma	150,616	155,376	--------	--------	15,003	13,864	--------	--------
South Dakota	41,630	43,041	11,477	8,317	2,140	2,177	--------	--------
Tennessee	32,897	33,541	1,790	2,040	2,361	2,338	--------	--------
Wisconsin	59,029	61,095	10,976	10,660	39,764	39,841	--------	--------
Total	1,203,870	1,259,936	76,651	79,969	[3] 252,948	[3] 230,419	--------	--------
District 3:								
Alabama	70,010	65,158	1,641	1,794	5,829	4,660	--------	--------
Arkansas	102,314	100,124	1,465	1,405	3,345	2,972	--------	--------
Louisiana	76,097	68,916	--------	--------	16,514	14,619	36,351	37,005
Mississippi	87,904	82,971	--------	--------	2,033	1,729	--------	--------
New Mexico	46,722	50,364	3,379	2,914	10,935	8,119	--------	--------
Texas	394,791	421,885	3,832	3,506	[4] 48,829	55,976	340,764	342,460
Total	777,838	789,418	10,317	9,619	[3,4] 123,835	[3] 115,908	377,115	379,465
District 4:								
Colorado	69,403	70,380	1,185	761	5,457	5,646	--------	--------
Idaho	12,036	12,977	1,350	880	1,533	1,576	--------	--------
Montana	21,382	23,143	--------	--------	1,452	1,469	--------	--------
Utah	11,526	12,266	2,099	1,488	915	1,123	--------	--------
Wyoming	26,569	28,644	583	250	1,077	1,020	--------	--------
Total	140,916	147,410	5,217	3,379	[3] 10,482	[3] 11,778	--------	--------
District 5:								
Arizona	18,401	16,204	--------	--------	1,419	1,489	--------	--------
California	161,802	150,108	7,915	9,127	13,385	9,041	40,986	38,724
Nevada	11,992	7,405	6,495	14,411	228	79	--------	--------
Oregon	36,711	33,417	10,388	11,866	2,634	3,869	--------	--------
Washington	18,532	18,001	7,129	6,564	2,359	2,026	--------	--------
Total	247,438	225,135	31,927	41,968	[3] 30,241	[3] 31,178	40,986	38,724
Total United States sales	3,001,021	3,067,070	212,293	231,155	[4] 581,506	563,879	418,101	418,189

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[1] Data include LR-gases.
[2] States are grouped according to petroleum-marketing districts rather than geographic regions.
[3] Consumption of refinery fuel shown in district totals only.
[4] Revised.

TABLE 12.—Sales of LP-gases[1] in the United States, 1956–57, by districts and States and uses, in thousand gallons—Continued

District[2] and State	Chemical		Internal combustion		All other		Total	
	1956	1957	1956	1957	1956	1957	1956	1957
District 1:								
Connecticut	---	---	609	565	2,558	2,047	40,603	42,053
Delaware	54	27	82	85	205	215	13,520	15,511
Florida	---	---	8,656	9,591	1,218	1,275	150,721	153,491
Georgia	92	411	4,404	5,540	1,929	2,040	95,843	96,853
Maine	---	---	81	73	915	1,015	19,746	22,066
Maryland and District of Columbia	---	---	579	690	140	155	38,057	41,065
Massachusetts	---	---	244	276	751	733	38,672	40,370
New Hampshire	---	---	---	---	25	16	15,310	16,028
New Jersey	29,741	27,507	471	709	350	384	91,735	90,840
New York	3,126	2,242	1,788	2,569	150	184	99,041	101,674
North Carolina	51	41	1,183	1,743	2,368	2,773	83,881	84,767
Pennsylvania	12,105	16,578	880	1,096	91	110	111,910	119,137
Rhode Island	---	40	---	9	21	10	6,361	7,586
South Carolina	419	50	1,404	1,574	632	621	54,822	55,550
Vermont	---	---	---	---	75	50	14,293	14,284
Virginia	92	91	471	499	325	315	43,353	45,686
West Virginia	278,615	208,307	559	579	50	30	289,953	220,415
Total	324,295	255,294	21,411	25,598	11,803	11,973	[3] 1,240,649	[3] 1,208,852
District 2:								
Illinois	117,494	137,033	44,626	48,177	880	952	355,420	395,337
Indiana	1,880	1,387	12,045	14,312	1,741	1,881	133,702	141,769
Iowa	---	---	3,884	4,786	1,061	1,096	105,730	109,677
Kansas	826	---	34,022	38,924	1,591	1,835	173,755	183,126
Kentucky	119,482	96,948	4,330	5,209	90	99	172,892	155,672
Michigan	10,640	2,665	4,043	4,851	2,013	2,306	101,158	97,897
Minnesota	---	---	8,263	9,174	1,927	1,990	118,057	125,178
Missouri	---	11	8,780	9,879	626	564	153,034	160,794
Nebraska	---	---	10,116	11,693	1,028	1,070	83,059	87,876
North Dakota	---	---	7,599	8,241	538	562	44,800	46,463
Ohio	---	10	3,029	3,800	431	501	64,016	66,723
Oklahoma	3,489	5,422	41,186	47,708	1,530	1,752	[4] 211,824	224,122
South Dakota	40	10	2,993	3,544	465	455	58,745	57,544
Tennessee	1,246	854	3,291	4,007	253	249	41,838	43,029
Wisconsin	---	---	4,998	5,731	620	585	115,387	117,912
Total	255,097	244,340	193,205	220,036	14,794	[5] 19,650	[3] 1,996,565	[3] [5] 2,054,350
District 3:								
Alabama	---	---	6,230	6,231	128	134	83,838	77,977
Arkansas	---	---	30,449	31,327	1,663	1,997	139,236	137,825
Louisiana	184,074	144,798	26,861	27,095	201	224	340,098	292,657
Mississippi	---	---	19,939	20,455	1,884	2,255	111,760	107,410
New Mexico	---	---	35,414	36,990	974	978	97,424	99,365
Texas	[4] 750,827	1,008,486	343,566	344,042	9,188	8,885	1,891,797	2,185,240
Total	[4] 934,901	1,153,284	462,459	466,140	14,038	[5] 62,861	[3] 2,700,503	[3] [5] 2,976,695
District 4:								
Colorado	124	18	11,320	12,508	438	508	87,927	89,821
Idaho	---	---	199	264	---	12	15,118	15,709
Montana	---	---	2,738	3,090	50	57	25,622	27,759
Utah	---	---	1,720	2,322	169	161	16,429	17,360
Wyoming	---	---	6,735	7,479	36	41	35,000	37,434
Total	124	18	22,712	25,663	693	[5] 5,716	[3] 180,144	[3] [5] 193,964
District 5:								
Arizona	---	---	10,215	8,082	559	1,170	30,594	26,945
California	86,187	79,402	61,515	58,044	5,169	4,824	376,959	349,270
Nevada	---	---	141	130	---	---	18,856	22,025
Oregon	---	---	1,383	992	1,574	2,566	52,690	50,900
Washington	---	---	430	371	137	1,195	28,587	28,157
Total	86,187	79,402	73,684	67,619	7,439	[5] 21,234	[3] 517,902	[3] [5] 505,260
Total United States sales	[4] 1,600,604	1,732,338	773,471	805,056	48,767	121,434	6,635,763	6,939,121

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[1] Data include LR-gases.

[2] States are grouped according to petroleum-marketing districts rather than geographic areas.

[3] Consumption of refinery fuel shown in district totals only.

[4] Revised.

[5] Consumption of gases used in the secondary recovery of petroleum shown in district totals only.

TABLE 13.—Sales of LP-gases[1] in the United States, 1956–57, by districts and States, in thousand gallons

District[2] and State	Butane		Propane		B-P mixture		All other mixtures		Total LP-gases		Percent change
	1956	1957	1956	1957	1956	1957	1956	1957	1956	1957	
District 1:											
Connecticut	563	570	39,962	41,418	78	65			40,603	42,053	3.6
Delaware		12	13,520	15,499					13,520	15,511	14.7
Florida	4,488	9,512	120,838	127,887	25,395	16,092			150,721	153,491	1.8
Georgia	3,003	3,958	79,254	85,942	13,586	6,953			95,843	96,853	1.1
Maine		18	19,746	22,046		2			19,746	22,066	11.7
Maryland and District of Columbia		36	38,057	41,027		2			38,057	41,065	7.9
Massachusetts	223	220	38,399	40,106	50	44			38,672	40,370	4.4
New Hampshire	699	745	14,539	15,210	72	73			15,310	16,028	4.7
New Jersey	26,633	27,917	61,024	62,691	4,078	222		[3] 10	91,735	90,840	−1.0
New York	313	294	96,460	99,740	2,268	1,640			99,041	101,674	10.3
North Carolina	193	213	81,183	82,944	2,505	1,610			83,881	84,767	1.1
Pennsylvania	3,428	4,025	107,162	114,057	1,320	1,055			111,910	119,137	6.5
Rhode Island			6,361	7,586					6,361	7,586	19.3
South Carolina	6,271	6,979	42,489	44,518	6,062	4,053			54,822	55,550	1.3
Vermont			14,196	14,199	97	85			14,293	14,284	−.1
Virginia	263	1,008	43,090	44,678					43,353	45,686	5.4
West Virginia	17,185	17,050	7,672	7,121	9,577	346	255,519	195,898	289,953	220,415	−24.0
Total	[4] 91,507	[4] 105,589	[4] 828,535	[4] 875,113	65,088	32,242	255,519	195,908	[4] 1,240,649	[4] 1,208,852	−2.6
District 2:											
Illinois	18,630	23,295	215,595	232,663	5,072	3,461	116,123	135,918	355,420	395,337	11.2
Indiana	11,549	15,066	121,368	126,311	785	392			133,702	141,769	6.0
Iowa	1,601	2,772	103,634	106,441	495	464			105,730	109,677	3.7
Kansas	25,884	33,214	127,407	134,852	20,464	15,060			173,755	183,126	5.4
Kentucky	2,273	6,391	49,479	52,431	2,142	1,336	118,998	95,514	172,892	155,672	−10.0
Michigan	3,644	4,801	95,259	90,405	34	26	2,221	2,665	101,158	97,897	−3.2
Minnesota	8,251	10,121	108,762	114,417	1,044	640			118,057	125,178	6.0
Missouri	5,764	9,157	141,225	147,528	6,045	4,109			153,034	160,794	5.1
Nebraska	5,203	6,481	73,865	78,706	3,991	2,689			83,059	87,876	5.8
North Dakota	1,078	1,425	42,213	43,660	1,509	1,378			44,800	46,463	3.7
Ohio	900	2,088	63,116	64,622		13			64,016	66,723	4.2
Oklahoma	30,684	49,658	120,648	131,019	60,492	40,581	[3] 6,254	[3] 2,864	218,078	224,122	2.8
South Dakota	1,329	1,860	57,069	55,356	347	328			58,745	57,544	−2.0
Tennessee	388	1,161	38,017	39,441	3,433	2,427			41,838	43,029	2.8
Wisconsin	19,423	20,110	93,766	95,899	2,198	1,903			115,387	117,912	2.2
Total	[4] 176,662	[4] [5] 212,644	[4] 1,464,235	[4] [5] 1,525,318	[4] 112,072	[4] 79,427	243,596	236,961	[4] 1,996,565	[4] [5] 2,054,350	2.9
District 3:											
Alabama	5,628	7,606	41,862	47,021	36,348	23,350			83,838	77,977	−7.0
Arkansas	18,400	23,753	66,355	72,807	54,481	41,265			139,236	137,825	−1.0

Louisiana	41,018	54,890	37,553	38,350	77,487	57,419	184,040	141,998	340,098	292,657	−13.9
Mississippi	9,355	11,873	49,024	54,794	53,381	40,743	----------	----------	111,760	107,410	−3.9
New Mexico	15,001	19,460	55,053	59,814	27,370	20,091	----------	----------	97,424	99,365	2.0
Texas	425,131	567,679	574,507	788,039	635,909	558,549	[6] 256,250	[7] 270,973	1,891,797	2,185,240	15.5
Total	[4] 538,408	[4, 5] 703,504	[4] 830,647	[4, 5] 1,115,962	[4] 891,158	[4, 5] 744,258	[4] 440,290	412,971	[4] 2,700,503	[4, 5] 2,976,695	10.2
District 4:											
Colorado	6,784	9,038	74,195	76,963	6,948	3,820	----------	----------	87,927	89,821	2.2
Idaho	423	596	14,695	15,113	----------	----------	----------	----------	15,118	15,709	3.9
Montana	1,164	2,556	24,458	25,197	----------	6	----------	----------	25,622	27,759	8.3
Utah	364	1,066	16,065	16,286	----------	8	----------	----------	16,429	17,360	5.7
Wyoming	4,595	6,701	28,336	29,143	2,069	1,590	----------	----------	35,000	37,434	7.0
Total	[4] 13,349	[4, 5] 23,650	[4] 157,778	[5] 164,890	9,017	5,424	----------	----------	[4] 180,144	[4, 5] 193,964	7.7
District 5:											
Arizona	----------	----------	27,567	22,577	3,027	4,368	----------	----------	30,594	26,945	−11.9
California	67,708	59,651	211,162	192,212	76,482	65,201	21,607	32,206	376,959	349,270	−7.3
Nevada	----------	----------	18,856	22,025	----------	----------	----------	----------	18,856	22,025	16.8
Oregon	----------	----------	50,826	48,641	1,864	2,259	----------	----------	52,690	50,900	−3.4
Washington	----------	----------	27,279	27,153	1,308	1,004	----------	----------	28,587	28,157	−1.5
Total	[4] 68,619	[4, 5] 72,361	[4] 344,994	[4, 5] 327,861	[4] 82,682	72,832	21,607	32,206	[4] 517,902	[4, 5] 505,260	−2.4
Total United States sales	888,545	1,117,748	3,626,189	4,009,144	1,160,017	934,183	[8] 961,012	[9] 878,046	6,635,763	6,939,121	4.6
Exports [10, 11]	----------	----------	----------	----------	----------	----------	----------	----------	179,506	190,603	6.2
Grand total	----------	----------	----------	----------	----------	----------	----------	----------	6,815,269	7,129,724	4.6

---

[1] Data include LR-gases.

[2] States are grouped according to petroleum-marketing districts rather than geographic areas.

[3] Isobutane.

[4] Consumption of refinery fuel shown in district totals only.

[5] Consumption of gases used in the secondary recovery of petroleum shown in district totals only.

[6] Includes 29,834,000 gallons of isobutane.

[7] Includes 23,847,000 gallons of isobutane.

[8] Includes 36,088,000 gallons of isobutane.

[9] Includes 26,721,000 gallons of isobutane.

[10] Not available by the different gases.

[11] Converted from pounds to gallons at 4.5 pounds per gallon.

STOCKS

Stocks of natural-gas liquids at plants and terminals increased only 52 million gallons in 1957. Stocks of LP-gas furnished 44 million gallons of this increase. Underground stocks of liquefied gases (including LR-gas) totaled 493 million gallons on December 31, 1957, with 420 million gallons the preceding year.

TABLE 14.—Stocks of natural-gas liquids in the United States, 1953–56 and 1957, by months, in thousand gallons

Date	Natural gasoline		LP-gases		Other products		Total		
	At plants and terminals	At refineries	At plants and terminals	At refineries	At plants and terminals	At refineries	At plants and terminals	At refineries	Grand total
Dec. 31:									
1953	126, 924	60, 312	157, 164	13, 986	75, 978	3, 612	360, 066	77, 910	437, 976
1954	95, 021	76, 650	286, 352	22, 176	100, 545	8, 862	481, 918	107, 688	589, 606
1955	92, 047	73, 752	281, 649	18, 480	96, 299	7, 476	469, 995	99, 708	569, 703
1956	136, 335	58, 422	560, 928	26, 166	72, 345	9, 282	769, 608	93, 870	863, 478
1957									
Jan. 31	144, 981	55, 818	424, 113	24, 864	79, 153	11, 886	648, 247	92, 568	740, 815
Feb. 28	147, 952	62, 412	416, 272	26, 082	79, 889	9, 156	644, 113	97, 650	741, 763
Mar. 31	139, 715	55, 440	481, 840	32, 844	77, 008	13, 818	698, 563	102, 102	800, 665
Apr. 30	140, 590	61, 362	550, 624	34, 734	73, 907	9, 954	765, 121	106, 050	871, 171
May 31	151, 858	66, 570	701, 894	38, 136	72, 517	11, 382	926, 269	116, 088	1, 042, 357
June 30	153, 375	61, 866	806, 108	44, 142	71, 177	8, 190	1, 030, 660	114, 198	1, 144, 858
July 31	137, 811	60, 228	865, 304	47, 586	74, 347	9, 534	1, 077, 462	117, 348	1, 194, 810
Aug. 31	120, 326	66, 864	910, 683	42, 462	73, 298	8, 232	1, 104, 307	117, 558	1, 221, 865
Sept. 30	119, 421	55, 692	933, 476	35, 658	76, 182	8, 946	1, 129, 079	100, 296	1, 229, 375
Oct. 31	128, 574	49, 350	880, 401	22, 638	79, 694	8, 526	1, 088, 669	80, 514	1, 169, 183
Nov. 30	126, 092	46, 536	779, 713	23, 226	87, 518	11, 088	993, 323	80, 850	1, 074, 173
Dec. 31	121, 414	46, 830	605, 249	22, 596	94, 481	15, 246	821, 144	84, 672	905, 816

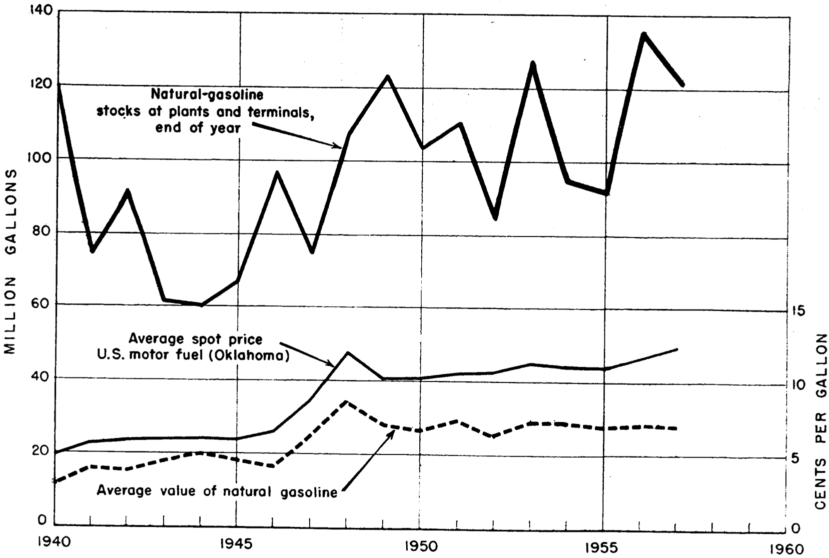

FIGURE 2.—Average value of natural gasoline, spot price of gasoline, and stocks of natural gasoline, 1940–57.

PRICES

The average posted prices of Grade 26–70 natural gasoline to blenders f. o. b. group 3 basis was 4.35 cents per gallon in 1957, a decrease of 0.49 cent per gallon over 1956. The posted price of 5.0 cents at the beginning of the year dropped to 4.0 during the summer months and then increased to 4.52 cents per gallon in December. The average value received for all grades of natural gasoline by producers was 6.8 cents per gallon in 1957 compared with 7.1 cents in 1956.

The average posted price in 1957 of propane f. o. b. Houston, Tex., was 4.38 cents per gallon compared with 4.78 cents in 1956. The average price in January (5.13 cents per gallon) declined to a low of 3.88 cents in July and then increased to an average of 4.77 cents in December.

Producers received an average of 3.96 cents per gallon for LP-gases in 1957, compared with 4.09 cents in 1956.

FOREIGN TRADE [3]

Exports of LP-gas increased 6 percent in 1957. Mexico and Canada continued to be the principal importers of LP-gases, constituting 80 percent of the total exports.

The export market for natural gasoline declined over the years from a 5-year (1948–52) average of 107 million gallons to 2 million gallons in 1957, of which Canada received 96 percent.

TABLE 15.—Natural gasoline exported from the United States, 1948–52 (average) and 1953–57, by countries, in thousand gallons

[Bureau of the Census]

Country	1948–52 (average)	1953	1954	1955	1956	1957
North America:						
Canada	41,683	34,186	24,854	5,447	8,362	1,82
Mexico	9	18	16	---	14	[illegible]
Netherlands Antilles	18,814	5,604	---	---	---	---
Trinidad and Tobago	2,723	---	---	---	---	---
Other North America	3	---	38	---	---	---
Total	63,232	39,808	24,908	5,447	8,376	1,90
Europe:						
Italy	251	---	---	---	---	---
United Kingdom	24,702	---	---	---	---	---
Other Europe	1,430	---	---	---	---	---
Total	26,383	---	---	---	---	---
Asia	1,141	---	---	---	---	---
Africa	21	---	---	---	---	---
Oceania:						
Australia	14,742	---	---	---	---	---
New Zealand	1,282	---	---	---	---	---
Other Oceania	(1)	---	---	---	---	---
Total	16,024	---	---	---	---	---
Grand total	106,801	39,808	24,908	5,447	8,376	

[1] Less than 500 gallons.

---

[3] Figures on exports compiled by Mae B. Price and Elsie D. Jackson, of the Bureau of Mines, from records of the U. S. Department of Commerce.

TABLE 16.—LP gases[1] exported from the United States, 1948–52 (average) and 1953–57, by countries, in thousand gallons[2]

[Bureau of the Census]

Country	1948–52 (average)	1953	1954	1955	1956	1957
North America:						
Canada-Newfoundland-Labrador	35,630	56,155	58,330	56,826	55,275	56,274
Cuba	1,534	4,719	5,865	6,416	8,382	10,158
Mexico	25,803	49,567	72,994	95,398	88,779	97,161
Netherlands Antilles	-----	-----	-----	-----	-----	6,728
Other North America	762	1,324	1,608	3,203	6,027	6,141
Total	63,729	111,765	138,797	161,843	158,463	176,462
South America:						
Argentina	123	(3)	1	7	1,033	107
Brazil	5,454	12,469	24,657	13,668	18,554	11,386
Other South America	10	1	144	485	348	368
Total	5,587	12,470	24,802	14,160	19,935	11,861
Europe:						
Denmark	(3)	(3)	-----	-----	-----	638
France	381	13	7	93	31	41
Germany	(3)	[4]1	[4]1	[4]333	[4]6	[4]4
Italy	(3)	(3)	2	24	125	845
Sweden	(3)	-----	-----	(3)	12	125
Other Europe	11	14	28	122	121	105
Total	392	28	38	572	295	1,758
Asia:						
Israel	[5]24	-----	(3)	(3)	37	36
Japan	52	(3)	250	461	313	195
Philippines	705	243	269	399	21	38
Syria	(3)	(3)	-----	-----	32	-----
Other Asia	9	(3)	24	2	35	15
Total	790	243	543	862	438	284
Africa	98	162	87	149	307	129
Oceania	45	81	41	122	68	109
Grand total	70,641	124,749	164,308	177,708	179,506	190,603

[1] Data include LR-gases.
[2] 4.5 pounds=1 gallon.
[3] Less than 500 gallons.
[4] West Germany.
[5] Includes Palestine.

TECHNOLOGY[4]

A combination refrigeration and oil-absorption cycle used in a plant in Cleveland County, Okla.,[5] provides a high degree of flexibility in extracting propane and butane from 30 million cubic feet of natural gas a day. The refrigeration system and the lean-oil system can be operated to accommodate changing gas composition, while maintaining the desired extraction of liquid hydrocarbons. A total of 100,000 barrels of extracted propane and butane is to be injected into each well in a 640-acre pilot liquefied-petroleum-gas-injection project in the Short Junction oilfield. Gas injection will follow the propane and butane injection.

The plant facilities include: (1) A 650-ton refrigeration system, (2) side-stream interchanger heater on the rich oil deethanizer, (3) dry distillation in the still operation, (4) an automatic safety shutdown system, and (5) packaged compressors, which permit a high degree of flexibility and low-cost expansion to the anticipated capacity of 60 million cubic feet of gas a day.

---

[4] By A. J. Kraemer, staff advisor, Division of Petroleum.
[5] Riedel, John C., Continental Oil Co.'s New 60 MM s. c. f. d. Short Junction Plant is a Dual-System Plant: Oil Gas Jour., vol. 55, No. 43, Oct. 28, 1957, pp. 113–120.

Automation and simplicity in design of a Louisiana cycling plant, which processes 27 million cubic feet of natural gas a day, permits operation by 1 man per shift.[6] Gas is received at the plant at a pressure of 3,000 pounds per square inch from fields in which the pressures range from 3,500 to 6,500 pounds per square inch; the wells are choked to provide the desired pressure at the plant. A safety shutdown system on the absorption and distillation facilities is included in the plant. Residue gas at a pressure of 2,000 pounds per square inch is piped directly to recompression units at the individual injection wells. High-pressure piping is avoided between the plant and wells in this way.

A special report [7] points out that process developments are placing refiners in a position to "soak up" low-octane natural gasoline, and as the octane race continues more natural gasoline will be used in refineries. Pipeline transportation and underground storage capacity are solving the problems of LPG utilization by correcting the seasonal unbalance of supply and demand. Automation will aid operators to improve plant-operating efficiencies.

In a concise discussion of the natural-gasoline situation [8] five possible ways to improve the position of natural-gasoline producers are analyzed: (1) Build in octanes to make natural gasoline "more attractive" as a motor-fuel blending component by increasing its octane rating, (2) maintain the status quo and trust that a change in motor-fuel characteristics and a tight crude-oil supply will make natural gasoline again highly desirable in its traditional markets, (3) develop new markets, (4) improve recovery processes, and (5) produce larger quantities of liquefied petroleum gases. Catalytic re-forming and isomerization are available processes for increasing the octane rating of natural gasoline. Gas chromatography and improved instrumentation can improve plant operation and control.

Economical underground storage of natural-gas liquids was advanced by leaching enough salt out of the Barbers Hill, Tex., salt dome to provide space for storing 6 million barrels of light hydrocarbons, approximately one-sixth of the total underground-storage capacity for liquefied petroleum gases in this country. As underground storage of liquefied petroleum gases is a recent development, provision of additional capacity for storage in the salt dome seems likely, as the petroleum and petrochemical industries expand in the Houston area.[9]

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[6] Resen, Larry, Cycling Plant Is One-Man Operation: Oil Gas Jour., vol. 55, No. 43, Oct. 28, 1957, pp. 98–99.

[7] Petroleum Week, Natural Gas Liquids: A Brighter Future: Vol. 4, No. 16, Apr. 19, 1957, pp. 36–42.

[8] Petroleum Week, Natural Gasoline's "Road Back" May be Long, Hard, and Full of Surprises: Spec. Rept., vol. 6, No. 15, Apr. 11, 1958, pp. 42–52.

[9] Oil and Gas Journal, New Era for Barbers Hill and LPG: Vol. 55, No. 34, Aug. 26, 1957, pp. 72–73.

Crude Petroleum and Petroleum Products

By James G. Kirby, Albert T. Coumbe, and Gladys Hilton

⁂

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GENERAL SUMMARY

TOTAL DEMAND [1] for petroleum and petroleum products in 1957 was 1.6 percent above the record peak of 1956. Exports, which for the past several years had been declining, increased 30.3 percent because of heavy shipments to Europe during the first 5 months of 1957. The shipments were made to relieve shortages of crude petroleum and petroleum products created by closing the Suez Canal in November 1956. The canal was reopened in May 1957, and exports from the United States resumed their normal pattern.

---

[1] Certain terms, as utilized in this chapter, are more or less unique to the petroleum industry. Principal terms, and their meanings, are as follows:

Total demand.—A derived figure representing total new supply plus decreases or minus increases in reported stocks. Because there are substantial secondary and consumers' stocks that are not reported to the Bureau of Mines, this figure varies considerably from consumption.

Domestic demand.—Total demand less exports.

New supply of all oils.—The sum of crude oil, and natural-gas liquids production plus benzol (coke-oven) used for motor-fuel, imports of crude oil and other petroleum products.

Transfers.—Crude oil conveyed to fuel-oil stocks without processing, or reclassification of products from one product category to another.

All oils.—Crude petroleum, natural-gas liquids, and their derivatives.

Principal product.—Gasoline, kerosine, distillate fuel oil, and residual fuel oil.

Exports.—Total shipments from continental United States, including shipments to United States Territories and possessions.

Barrels.—42 gallons per barrel.

Domestic demand increased only 0.2 percent in 1957—considerably below the normal rate of gain of recent years. The industry continued to operate at a high rate even after emergency shipments to Europe had stopped, and stocks of crude petroleum and petroleum products reached record highs in the third quarter of the year. In the fourth quarter production of crude petroleum was cut back, and crude stocks declined slightly. At the close of 1957 stocks of crude were 16 million barrels higher than a year ago, and stocks of petroleum products were 44 million barrels higher.

The total new supply of all oils in 1957 was 3.5 billion barrels compared with 3.4 billion in 1956. The increase was due to imports, which increased from 0.5 billion in 1956 to 0.6 billion barrels in 1957. Imports, which represented 15.3 percent of the total supply in 1956, increased to 16.4 percent in 1957.

TABLE 1.—Salient statistics of crude petroleum, refined products, and natural-gas liquids in the United States, 1953–57 [1]

	1953	1954	1955	1956	1957 [2]
Crude petroleum:					
Domestic production....thousand barrels [3]..	2,357,082	2,314,988	2,484,428	2,617,283	2,616,778
World production....do....	4,798,348	5,017,243	5,626,225	6,124,171	6,440,350
United States proportion......percent..	49	46	44	43	41
Imports [4]....thousand barrels [3]..	236,455	239,479	285,421	341,833	373,255
Exports [5]....do....	19,931	13,599	11,571	28,624	49,982
Stocks, end of year....do....	274,445	258,385	265,610	266,014	281,813
Runs to stills....do....	2,554,865	2,539,564	2,730,218	2,905,106	2,890,436
Value of domestic production at wells:					
Total....thousand dollars..	6,327,100	6,424,930	6,870,380	7,296,760	8,079,504
Average per barrel....	$2.68	$2.78	$2.77	$2.79	$3.09
Total producing oil wells Dec. 31....	498,940	511,200	524,010	551,170	569,273
Total oil wells completed during year (successful wells)....	25,762	29,773	31,567	31,158	28,164
Refined products:					
Imports [5]....thousand barrels [3]..	141,044	144,476	170,143	183,758	199,900
Exports [5]....do....	126,660	116,134	122,617	128,762	155,064
Stocks, end of year....do....	440,634	442,510	435,685	493,818	537,937
Output of gasoline....do....	1,266,376	1,261,304	1,373,950	1,428,807	1,438,408
Yield of gasoline....percent..	43.9	43.8	44.0	43.4	43.8
Average dealers, net price (excluding tax) of gasoline in 50 United States cities cents per gallon [6]..	15.95	16.19	16.18	16.34	16.69
Completed refineries, end of year....	337	326	318	319	318
Daily crude-oil capacity..thousand barrels [3]..	8,007	8,421	8,632	9,124	9,355
Natural-gas liquids:					
Production....thousand barrels [3]..	238,579	252,133	281,371	292,727	294,041
Stocks, end of year....do....	10,428	14,038	13,564	20,559	21,567

[1] Data, including imports and exports, are for continental United States.

[2] Preliminary figures.

[3] 42 gallons per barrel.

[4] Bureau of Mines.

[5] U. S. Department of Commerce, except Alaska and Hawaii, which are Bureau of Mines data. Exports include shipments to Territories.

[6] Platt's Oilgram Price Service.

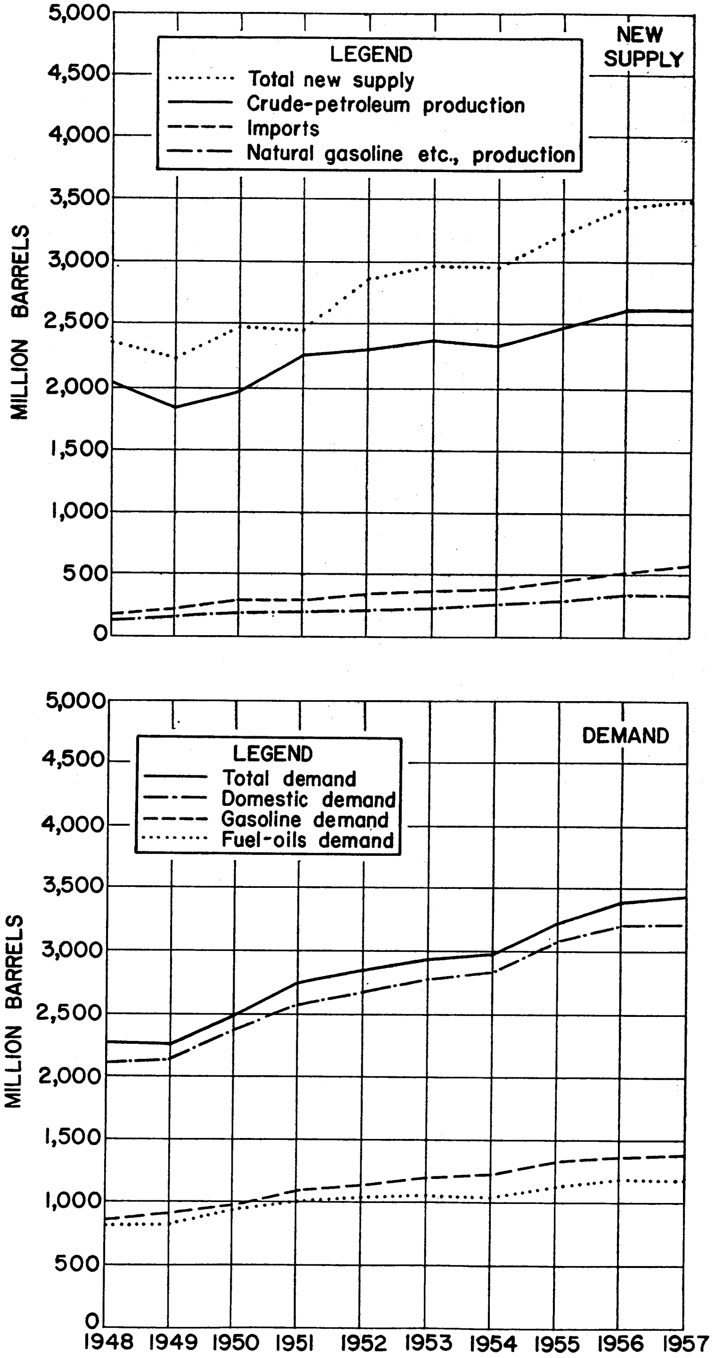

FIGURE 1.—Supply and demand of all oils in the United States, 1948–57.

TABLE 2.—Supply and demand of all oils [1] in continental United States, 1955 total and 1956–57, by months

(Thousand barrels)

	1956													1955 total
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
New supply:														
Domestic production:														
Crude petroleum	223, 125	209, 078	225, 645	214, 412	218, 942	213, 010	219, 770	223, 035	211, 585	215, 570	214, 438	228, 673	2, 617, 283	2, 484, 428
Natural-gas liquids	25, 320	23, 804	25, 265	23, 510	23, 988	23, 198	23, 456	24, 489	24, 166	24, 650	24, 608	26, 273	292, 727	281, 371
Benzol, etc	67	40	39	55	53	53	42	23	28	32	43	29	504	526
Total production	248, 512	232, 922	250, 949	237, 977	242, 983	236, 261	243, 268	247, 547	235, 779	240, 252	239, 089	254, 975	2, 910, 514	2, 766, 325
Imports:														
Crude petroleum [2]	24, 944	24, 585	28, 942	24, 462	29, 074	29, 606	33, 593	31, 029	31, 281	31, 123	26, 124	27, 071	341, 833	285, 421
Refined products [3]	19, 082	16, 605	15, 325	15, 160	15, 338	13, 406	12, 035	13, 140	12, 940	17, 411	14, 824	18, 492	183, 758	170, 143
Total new supply	292, 538	274, 111	295, 216	277, 599	287, 395	279, 273	288, 896	291, 716	280, 000	288, 786	280, 037	300, 538	3, 436, 105	3, 221, 889
Increase (+) or decrease (−) in stocks	−19, 842	−8, 056	−78	11, 545	19, 776	16, 353	33, 057	21, 682	19, 725	10, 507	−17, 822	−21, 315	65, 532	−74
Demand:														
Total demand	312, 380	282, 167	295, 294	266, 054	267, 619	262, 920	255, 839	270, 034	260, 275	278, 279	297, 859	321, 853	3, 370, 573	3, 221, 963
Exports: [3]														
Crude petroleum	994	501	1, 155	610	1, 236	857	748	1, 179	805	1, 444	8, 551	10, 544	28, 624	11, 571
Refined products	8, 427	7, 304	8, 828	10, 113	9, 384	9, 384	10, 441	10, 696	10, 077	10, 593	14, 020	19, 495	128, 762	122, 617
Domestic demand:														
Gasoline	100, 562	98, 123	112, 383	113, 063	123, 822	126, 717	120, 864	126, 070	111, 583	119, 586	112, 187	108, 119	1, 373, 079	1, 334, 205
Kerosine	17, 423	13, 870	12, 086	7, 980	5, 205	4, 342	6, 171	6, 876	8, 121	8, 753	12, 373	14, 124	117, 324	116, 808
Distillate fuel oil	83, 728	69, 192	65, 609	46, 587	38, 320	33, 448	31, 490	33, 033	41, 031	44, 285	57, 754	71, 379	615, 856	581, 128
Residual fuel oil	59, 621	54, 396	52, 599	46, 742	43, 687	39, 999	36, 217	39, 480	39, 487	45, 714	50, 490	54, 381	562, 813	557, 057
Lubricants	3, 511	3, 420	3, 478	3, 763	3, 978	3, 604	3, 717	3, 858	3, 492	4, 152	3, 473	3, 487	43, 933	42, 477
Miscellaneous	38, 114	35, 361	39, 156	37, 196	41, 987	44, 569	46, 191	48, 842	45, 679	43, 752	39, 011	40, 324	500, 182	456, 100
Total domestic demand	302, 959	274, 362	285, 311	255, 331	256, 999	252, 679	244, 650	258, 159	249, 393	266, 242	275, 288	291, 814	3, 213, 187	3, 087, 775
Stocks:														
Crude petroleum	261, 592	259, 504	265, 683	277, 121	277, 497	274, 491	277, 008	279, 944	278, 791	286, 560	275, 995	266, 014	266, 014	265, 610
Natural-gas liquids	11, 605	11, 392	12, 642	14, 356	16, 717	19, 586	21, 595	22, 307	23, 653	24, 178	22, 934	20, 559	20, 559	13, 564
Refined products	421, 820	416, 065	408, 558	406, 951	423, 990	440, 480	469, 011	487, 045	506, 577	508, 790	502, 777	493, 818	493, 818	435, 685
Total stocks	695, 017	686, 961	686, 883	698, 428	718, 204	734, 557	767, 614	789, 296	809, 021	819, 528	801, 706	780, 391	780, 391	714, 859

	1957 [4]													1956 total
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
New supply:														
Domestic production:														
Crude petroleum	231,880	215,006	239,214	226,231	230,458	213,202	212,771	210,043	206,590	212,106	204,484	214,793	2,616,778	2,617,283
Natural-gas liquids	25,611	23,682	25,573	24,630	25,214	23,228	22,743	24,347	23,795	24,888	24,930	25,400	294,041	292,727
Benzol, etc	24	34	33	20	25	24	21	13	21	17	16	4	252	504
Total production	257,515	238,722	264,820	250,881	255,697	236,454	235,535	234,403	230,406	237,011	229,430	240,197	2,911,071	2,910,514
Imports:														
Crude petroleum [2]	25,255	22,119	26,320	27,716	33,159	35,045	37,736	40,275	32,161	32,718	28,225	32,526	373,255	341,833
Refined products [3]	19,243	18,196	19,492	19,059	16,010	13,764	13,040	13,584	12,494	15,615	17,572	21,831	199,900	183,758
Total new supply	302,013	279,037	310,632	297,656	304,866	285,263	286,311	288,262	275,061	285,344	275,227	294,554	3,484,226	3,436,105
Increase (+) or decrease (−) in stocks	−51,834	−12,528	−484	14,699	39,402	32,738	16,862	16,697	23,051	4,411	−5,501	−16,587	60,926	65,532
Demand:														
Total demand	353,847	291,565	311,116	282,957	265,464	252,525	269,449	271,565	252,010	280,933	280,728	311,141	3,423,300	3,370,573
Exports: [3]														
Crude petroleum	7,460	8,009	14,100	9,013	3,703	1,745	1,197	995	739	1,007	926	1,088	49,982	28,624
Refined products	18,389	18,462	18,145	15,252	12,778	11,585	10,968	11,538	9,289	10,139	10,125	8,394	155,064	128,762
Domestic demand:														
Gasoline	109,295	96,694	113,166	115,820	124,325	121,598	130,251	128,808	113,567	119,334	107,705	112,691	1,393,254	1,373,079
Kerosine	17,946	12,153	10,291	6,747	4,327	3,826	4,948	4,828	6,486	10,085	11,442	14,593	107,672	117,324
Distillate fuel	92,060	65,815	60,855	45,991	32,883	31,970	31,120	33,674	38,362	48,669	60,029	74,760	617,088	615,856
Residual fuel oil	61,182	50,683	50,636	47,725	42,529	38,430	39,060	40,365	36,079	43,102	45,972	53,719	549,482	562,813
Jet fuel	6,552	6,766	7,941	6,478	6,120	4,333	7,122	5,832	4,064	5,296	5,932	4,713	71,149	(5)
Lubricants	3,774	3,382	3,374	3,653	3,869	3,037	3,897	3,717	3,169	3,621	2,881	2,872	41,246	43,933
Miscellaneous	36,289	29,601	32,608	32,278	34,930	36,001	40,886	41,808	40,255	39,680	35,716	38,311	438,363	500,182
Total domestic demand	327,998	265,094	278,871	258,692	248,983	239,195	257,284	259,032	241,982	269,787	269,677	301,659	3,218,254	3,213,187
Stocks:														
Crude petroleum	256,244	256,344	254,911	265,796	275,963	284,312	288,241	283,388	280,469	284,517	281,769	281,813	281,813	266,014
Natural-gas liquids	17,638	17,661	19,063	20,742	24,818	27,259	28,448	29,092	29,271	27,838	25,575	21,567	21,567	20,559
Refined products	454,675	442,024	441,571	443,706	468,865	490,813	502,557	523,463	549,254	551,050	550,560	537,937	537,937	493,818
Total stocks	728,557	716,029	715,545	730,244	769,646	802,384	819,246	835,943	858,994	863,405	857,904	841,317	841,317	780,391

[1] For definition of this and other terms used in the petroleum industry, see text footnote 1 at the beginning of this chapter.

[2] Bureau of Mines.

[3] U. S. Department of Commerce, except for exports to Alaska and Hawaii, which are Bureau of Mines data.

[4] Preliminary figures.

[5] Formerly included with Miscellaneous.

TABLE 3.—Demand for all oils [1] in continental United States, 1948–57

(Million barrels)

Year	Domestic demand	Exports	Total demand	Year	Domestic demand	Exports	Total demand
1948	2,113.7	134.7	2,248.4	1953	2,775.3	146.6	2,921.9
1949	2,118.2	119.4	2,237.6	1954	2,832.4	129.7	2.962.1
1950	2,375.1	111.3	2.486.4	1955	3,087.8	134.2	3,222.0
1951	2,569.8	154.1	2,723.9	1956	3,213.2	157.4	3,370.6
1952	2,664.4	158.2	2,822.6	1957 [2]	3,218.3	205.0	3,423.3

[1] See text footnote 1 at beginning of this chapter.
[2] Preliminary figures.

DEMAND BY PRODUCTS

As most of the indicated consumption of crude oil in continental United States is converted into products at refineries, before sale to ultimate consumers, the analysis of demand trends involves consideration of each major product. The fuel oils (residual, distillate, and kerosine) compete directly with natural gas or coal in heating, cooking, and industrial uses. Gasoline and diesel fuel are the major fuels in the transportation field. The other products serve a wide variety of uses in competition with other oil products as fuel and in special uses outside the fuels field. The use of jet fuel (a blend of low-grade gasoline, kerosine, and distillate) has advanced rapidly in the last few years. To date it has been limited mostly to military purposes.

Gasoline.—Gasoline represented 41.8 percent of the total demand for all oils in 1957. Compared with 1956, the total demand for gasoline increased 1.6 percent, exports were 8.4 percent higher, and domestic demand increased 1.5 percent. A breakdown of domestic demand by uses indicates that civilian highway use accounted for 85.8 percent and aviation gasoline 5.3 percent, leaving a balance of 8.9 percent for nonhighway vehicles, military vehicles, stationary engines, and losses. The total gasoline demand includes aviation gasoline and commercial naphthas.

Residual Fuel Oil.—The demand for residual fuel oil continued to decline in 1957. The total demand declined 0.6 percent below 1956, and domestic demand 2.4 percent. Exports were 35.6 percent above those in 1956, owing to heavy shipments to Europe during the first 5 months of 1957. According to data compiled by the Interstate Commerce Commission, the Nation's Class I railroads, continuing the downward trend in consumption of the past several years, used 36.8 percent less residual fuel oil in 1957 than in 1956. Reports issued by the United States Department of Commerce show that residual fuel used for bunkering vessels engaged in foreign trade totaled 37.8 million barrels in 1957 compared with 27.9 million barrels for 1956.

Stocks of residual fuel oil increased 15.5 million barrels in 1957. Production was 11.0 million barrels less than in 1956, and imports totaled 173.2 million barrels—a 6.3-percent increase over 1956. Crude oil used directly as residual fuel increased substantially for the year, as large volumes were imported and used for fuel without further refining.

Distillate Fuel Oil.—The total demand for distillate fuel oil gained 2.1 percent in 1957. Domestic demand increased 0.2 percent and exports 13.5 percent. The gain in exports occurred during the first 6 months of 1957, when heavy shipments were made to European countries that were cut off from supplies in the Middle East by closing the Suez Canal.

Kerosine.—The total demand for kerosine declined 6.4 percent in 1957. Domestic demand was 8.2 percent below 1956, whereas exports were 60.4 percent higher than in 1956.

Other Products.—The total demand for all other products includes crude-oil exports and losses and refinery shortage or overage. Domestic demand for other products increased only 1.2 percent, compared with an 8.0-percent increase in 1956. Some products in this group showed gains in domestic demand ranging from 1.4 percent for liquefied gases to 20.0 percent for miscellaneous-type oils; however, domestic demand for jet fuel, lubricating oil, asphalt, and road oil decreased in 1957.

Exports of crude oil were 74.6 percent higher than in 1956. The large shipments to Europe, which began in November 1956, continued through May 1957 when the Suez Canal was reopened and the European countries again were able to receive most of their supplies from the Middle East.

Shipments to United States Territories and Possessions.—Domestic demand, as defined in this chapter, refers to demand in continental United States only. Shipments from the United States to Territories and possessions are included with exports. Any foreign receipts into these areas are not included in the total imports shown.

Shipments from Territories and possessions to foreign countries are excluded from total exports. Shipments from Territories to the United States are included in total continental imports.

TABLE 4.—Imports of petroleum products into United States Territories and possessions, 1956–57 [1]

(Thousand barrels)

	1956			1957 [2]		
	From continental United States	Foreign	Total	From continental United States	Foreign	Total
Gasoline	7,507	325	7,832	8,076	230	8,306
Kerosine	422	232	654	391	95	486
Distillate fuel oil	2,950	412	3,362	3,202	585	3,787
Residual fuel oil	6,276	3,414	9,690	7,046	3,205	10,251
Jet fuel	3	505	508	15	429	444
Lubricants:						
Grease	3	----------	3	3	----------	3
Oil	215	----------	215	212	----------	212
Coke	46	----------	46	50	----------	50
Asphalt	219	18	237	265	19	284
Unfinished oils	----------	760	760	----------	588	588
Total	17,641	5,666	23,307	19,260	5,151	24,411

[1] Source: U. S. Department of Commerce, except for imports to Alaska and Hawaii from continental United States, which are Bureau of Mines data.

[2] Preliminary figures.

SCOPE OF REPORT

This report deals primarily with statistics for production, refining, distribution, and indicated consumption of crude petroleum and refined products in continental United States. The objective of the limitation to continental United States is to permit a breakdown and balancing of supply and demand of operations by States and districts. The composition of the districts used by the Bureau of Mines is explained in the next section.

The increasing volume of natural-gas liquids recovered from natural gas has made it necessary to include data on these liquids with crude oil data, as they are either blended with refinery products or are identical with materials recovered from refinery gases. These natural-gas liquids are recovered at special plants away from the oil refineries.

Most of the data were compiled by the Bureau of Mines from detailed reports, submitted on a voluntary basis by the various companies. These data are published monthly for release about 6 weeks after the end of the month concerned. Complete coverage, with only minor estimates, is procured for production, stocks, and refinery operations. The Bureau of Mines used the import data as reported by the refineries for crude oil and unfinished oils. Other product imports and all export data were taken from records of the United States Department of Commerce.

The impossibility of contacting many small producers to obtain current monthly data for crude-oil production makes it necessary to use pipeline-company reports. These companies report by States of origin, stocks on leases, oil taken from the leases, pipeline and tank-farm stocks, and crude deliveries. The data are crosschecked against reports from refineries showing crude receipts by States of origin and method of transportation. These reports include information covering final receipts by water, tank cars, and trucks and cover stocks of crude oil, held at refineries by States of origin. The data are checked further against available current and annual production figures collected by State agencies and supplemented by estimates of unreported lease stocks. The Bureau of Mines crude-production figure includes some field condensate dumped in crude lines that cannot be identified when received at refineries and included with the crude runs reported.

Individual refineries reported monthly receipts, input, stocks at the beginning and end of the month, refinery production, and deliveries. Data on both product stocks at refineries and pipeline and bulk terminal stocks are collected.

Annual canvasses provide supplemental information on the value of crude petroleum at wells, the number of producing oil wells, sales of fuel oils by uses, and refinery capacity. The table showing world production of crude oil by countries is based on monthly reports that also included data on crude movements and refinery operations. Data on crude reserves, wells drilled, and current prices were taken from the sources indicated in the footnotes.

The tables on Relative Rate of Growth of Coal, Petroleum, Natural Gas, and Waterpower, which appeared in the Bituminous Coal and Lignite chapter of the Minerals Yearbook before 1956, will be found for 1956 and 1957 in the Review of the Mineral-Fuel Industries chapter of volume III.

DISTRICTS

The Bureau of Mines reported production of crude petroleum and natural-gas liquids and the number of wells drilled by States. Louisiana, New Mexico, and Texas were also reported by districts.

Louisiana is divided into a Northern Louisiana district and a Louisiana Gulf Coast district. The Gulf Coast district includes Vernon, Rapides, Avoyelles, Pointe Coupee, West Feliciana, East Feliciana, Tangipahoa, St. Helena, and Washington Parishes and all parishes in the State south of these. All parishes not included in the Gulf Coast district are in the Northern Louisiana district.

New Mexico has two widely separated producing areas. The Southeastern district in the southeastern corner of the State comprises mainly Lea, Eddy, Chaves, and Roosevelt Counties. The Northwestern district in the northwestern corner of the State comprises mainly San Juan, Rio Arriba, Sandoval, and McKinley Counties.

The Bureau of Mines production districts in Texas correspond, with one exception, to groupings of the Texas Railroad Commission districts.

Bureau of Mines district:	*Railroad Commission district*
Gulf Coast	Nos. 2 and 3.
West Texas	Nos. 7C and 8.
East Proper	Part of No. 6 (East Texas field in Cherokee, Smith, Upshur, Rush, and Gregg Counties).
Panhandle	No. 10.
Rest of State:	
North	Nos. 7B and 9.
Central	No. 1.
South	No. 4.
Other East Texas	Nos. 5 and 6 (exclusive of East Proper).

The Bureau of Mines groups refinery operations into another set of districts called refining districts. These refining districts correspond with the grouping originated by the Petroleum Administration for War during World War II and called PAW districts.

PAW district	*Refining district*
1	*East Coast*—District of Columbia and Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Caroline, Georgia, and Florida; the following counties of New York: Cayuga, Tompkins, Chemung, and all counties east and north thereof; and the following counties of Pennsylvania: Bradford, Sullivan, Columbia, Montour, Northumberland, Dauphin, York, and all counties east thereof.
1	*Appalachian No. 1*—West Virginia and those parts of Pennsylvania and New York not included in the East Coast district.
2	*Appalachian No. 2*—The following counties of Ohio: Erie, Huron, Crawford, Marion, Delaware, Franklin, Pickaway, Ross, Pike, Scioto, and all counties east thereof.
2	*Indiana-Illinois-Kentucky*—Indiana, Illinois, Kentucky, Tennessee, Michigan, and that part of Ohio not included in the Appalachian district.
2	*Oklahoma-Kansas-Missouri*—Oklahoma, Kansas, Missouri, Nebraska, and Iowa.
2	*Minnesota-Wisconsin-North Dakota-South Dakota*—Minnesota, Wisconsin, North Dakota, and South Dakota.
3	*Texas Island*—Texas, except the Texas Gulf Coast district.
3	*Texas Gulf Coast*—The following counties of Texas: Newton, Orange, Jefferson, Jasper, Tyler, Hardin, Liberty, Chambers, Polk, San Jacinto, Montgomery, Harris, Galveston, Waller, Fort Bend, Brazoria, Wharton, Matagorda, Jackson, Victoria, Calhoun, Refugio, Aransas, San Patricio, Nueces, Kleberg, Kenedy, Willacy, and Cameron.

PAW district	*Refining district*
3	*Louisiana Gulf Coast*—The following parishes of Louisiana: Vernon, Rapides, Avoyelles, Pointe Coupee, West Feliciana, East Feliciana, Tangipahoa, St. Helena, Washington, and all parishes south thereof; the following counties of Mississippi: Pearl River, Stone, George, Hancock, Harrison, and Jackson; and Mobile and Baldwin Counties, Ala.
3	*North Louisiana-Arkansas*—Arkansas and those parts of Louisiana, Mississippi, and Alabama not included in the Louisiana Gulf Coast district.
3	*New Mexico*—New Mexico.
4	*Rocky Mountain*—Montana, Idaho, Wyoming, Utah, and Colorado.
5	*West Coast*—Washington, Oregon, California, Nevada, and Arizona.

WORLD OIL SUPPLY

The 1957 world production of crude oil was 6,440.4 million barrels, an increase of 316.2 million barrels or 5.2 percent for the year. The United States produced 40.6 percent of the total in 1957, compared with 42.7 percent in 1956.

Refineries throughout the world processed 6,319.2 million barrels of crude oil in 1957, of which 2,890.4 million barrels was refined in the United States. Crude runs to stills throughout the world were 3.9 percent higher in 1957 than in 1956, but in the United States they declined 0.5 percent.

RESERVES

The American Petroleum Institute Committee on Petroleum Reserves estimated proved reserves of crude oil in the United States to be 30.3 billion barrels on December 31, 1957. This estimate is 0.1 billion barrels less than a year ago and is the first drop in proved reserves since 1943.

The estimates of crude-oil reserves include only oil recoverable under existing economic and operating conditions.

TABLE 5.—Estimates of proved oil reserves in the United States, on December 31, 1950–57, by States [1]

(Million barrels)

State	1950	1951	1952	1953	1954	1955	1956	1957
Eastern States:								
Illinois	564	646	619	625	658	691	700	655
Indiana	57	51	56	62	67	62	68	67
Kentucky	56	59	56	82	85	107	149	138
Michigan	79	64	57	61	60	59	55	49
New York	59	57	53	49	46	43	40	37
Ohio	27	26	27	32	37	56	64	68
Pennsylvania	106	95	122	111	102	93	135	126
West Virginia	39	39	37	36	37	47	51	53
Total	987	1,037	1,027	1,058	1,092	1,158	1,262	1,193
Central and Southern States:								
Arkansas	342	337	352	358	351	330	318	305
Kansas	732	792	917	913	979	998	992	947
Louisiana	[2] 2,185	[2] 2,285	[2] 2,558	[2] 2,760	[2] 2,962	[2] 3,255	[2] 3,675	[2] 3,858
Mississippi	386	385	359	350	412	388	368	360
Nebraska	10	16	22	26	38	57	63	63
New Mexico	592	612	733	815	806	820	836	832
North Dakota	----------	5	76	128	134	185	196	258
Oklahoma	1,397	1,476	1,558	1,752	1,955	2,016	2,010	1,941
Texas	[2] 13,581	[2] 15,315	[2] 14,916	[2] 14,999	[2] 14,982	[2] 14,934	[2] 14,783	[2] 14,555
Total	19,225	21,223	21,491	22,101	22,619	22,983	23,241	23,119
Mountain States:								
Colorado	339	325	306	319	329	334	364	310
Montana	111	108	156	209	272	299	331	320
Utah	22	30	42	38	36	37	61	140
Wyoming	841	973	1,065	1,279	1,304	1,374	1,363	1,420
Total	1,313	1,436	1,569	1,845	1,941	2,044	2,119	2,190
Pacific Coast States: California	[2] 3,734	[2] 3,761	[2] 3,854	[2] 3,920	[2] 3,889	[2] 3,801	[2] 3,771	[2] 3,760
Other States [3]	9	11	20	21	20	26	42	38
Total United States	25,268	27,468	27,961	28,945	29,561	30,012	30,435	30,300

[1] From reports of Committee on Petroleum Reserves, American Petroleum Institute. Includes crude oil that may be extracted by present methods from fields completely developed or explored enough to permit reasonably accurate calculations. The change in reserves during any year represents total new discoveries, extensions, and revisions, minus production.

[2] Includes offshore reserves.

[3] Includes Alabama, Arizona, Florida, Missouri, Nevada, South Dakota, Tennessee, and Virginia.

CRUDE PETROLEUM

The new supply of crude petroleum in the United States is derived primarily from domestic production but has been augmented by an increasing volume of imports. Crude imports comprised 12.8 percent of the crude supply in 1957 and 11.8 percent in 1956. Voluntary import controls were initiated in July 1957 by the President of the United States, based upon recommendations of a cabinet committee. The purpose of these controls is to keep crude-oil imports from expanding at a rate that will be detrimental to domestic crude-oil production. The west coast of the United States was excluded from the first control provisions, but early in 1958 importers in that area also were assigned quotas and requested to comply.

The major part of the indicated demand for crude petroleum is converted into products before final consumption (97.2 percent in 1957), and the remainder represents exports, fuel, and losses.

TABLE 6.—Supply and demand[1] for crude petroleum in continental United States, 1953–57

(Thousand barrels)

	1953	1954	1955	1956	1957[2]
Production	2,357,082	2,314,988	2,484,428	2,617,283	2,616,778
Imports[3]	236,455	239,479	285,421	341,833	373,255
Total new supply	2,593,537	2,554,467	2,769,849	2,959,116	2,990,033
Increase (+) or decrease (−) in stocks, end of year	+2,517	−16,060	+7,225	+404	+15,799
Demand:					
Domestic crude	2,357,423	2,331,269	2,478,889	2,616,826	2,605,658
Foreign crude	233,597	239,258	283,735	341,886	368,576
Total demand	2,591,020	2,570,527	2,762,624	2,958,712	2,974,234
Runs to stills:					
Domestic	2,321,820	2,300,766	2,446,833	2,563,655	2,529,672
Foreign	233,045	238,798	283,385	341,451	360,764
Exports[4]	19,931	13,599	11,571	28,624	49,982
Transfers to fuel oil:					
Distillate	1,966	1,500	1,347	1,375	1,305
Residual	5,617	5,924	5,559	6,439	13,884
Other fuel and losses	8,641	9,940	13,929	17,168	18,627
Total demand	2,591,020	2,570,527	2,762,624	2,958,712	2,974,234

[1] For definition, see text footnote at the beginning of this chapter.
[2] Preliminary figures.
[3] Bureau of Mines data.
[4] U. S. Department of Commerce.

TABLE 7.—Supply of and demand for crude petroleum in continental United States 1956–57, by months

(Thousand barrels)

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
1956													
Supply:													
Production	223, 125	209, 078	225, 645	214, 412	218, 942	213, 010	219, 770	223, 035	211, 585	215, 570	214, 438	228, 673	2, 617, 283
Imports [1]	24, 944	24, 584	28, 942	24, 462	29, 074	29, 606	33, 593	31, 029	31, 281	31, 123	26, 124	27, 071	341, 833
Total new supply	248, 069	233, 662	254, 587	238, 874	248, 016	242, 616	253, 363	254, 064	242, 866	246, 693	240, 562	255, 744	2, 959, 116
Change in stocks, end of period:													
Domestic	−2, 532	−1, 913	5, 076	11, 490	−539	−3, 385	833	3, 677	−1, 828	7, 337	−8, 137	−9, 622	457
Foreign	−1, 486	−175	1, 103	−52	915	379	1, 684	−741	675	432	−2, 428	−359	−53
Demand:													
Domestic	225, 657	210, 991	220, 569	202, 922	219, 481	216, 395	218, 937	219, 358	213, 413	208, 233	222, 575	238, 295	2, 616, 826
Foreign	26, 430	24, 759	27, 839	24, 514	28, 159	29, 227	31, 909	31, 770	30, 606	30, 691	28, 552	27, 430	341, 886
Runs to stills:													
Domestic	222, 294	208, 634	217, 524	200, 131	216, 665	212, 908	216, 572	216, 141	210, 176	205, 193	212, 448	224, 969	2, 563, 655
Foreign	26, 427	24, 740	27, 816	24, 492	28, 119	29, 211	31, 867	31, 710	30, 532	30, 649	28, 496	27, 392	341, 451
Exports [2]	994	501	1, 155	610	1, 236	857	748	1, 179	805	1, 444	8, 551	10, 544	28, 624
Transfers:													
Distillate	134	114	127	102	108	106	111	115	108	104	116	130	1, 375
Residual	498	418	589	651	651	510	571	544	517	450	486	554	6, 439
Losses	1, 740	1, 343	1, 197	1, 450	861	2, 030	977	1, 439	1, 881	1, 084	1, 030	2, 136	17, 168
1957 [3]													
Supply:													
Production	231, 880	215, 006	239, 214	226, 231	230, 458	213, 202	212, 771	210, 043	206, 590	212, 106	204, 484	214, 793	2, 616, 778
Imports [1]	25, 255	22, 119	26, 320	27, 716	33, 159	35, 045	37, 736	40, 275	32, 161	32, 718	28, 225	32, 526	373, 255
Total new supply	257, 135	237, 125	265, 534	253, 947	263, 617	248, 247	250, 507	250, 318	238, 751	244, 824	232, 709	247, 319	2, 990, 033
Change in stocks, end of period:													
Domestic	−9, 370	1, 872	−3, 215	9, 608	8, 717	7, 232	3, 201	−5, 359	−2, 244	1, 919	1, 252	−2, 493	11, 120
Foreign	−400	−1, 772	1, 782	1, 277	1, 450	1, 117	728	506	−675	2, 129	−4, 000	2, 537	4, 679
Demand:													
Domestic	241, 250	213, 134	242, 429	216, 623	221, 741	205, 970	209, 570	215, 402	208, 834	210, 187	203, 232	217, 286	2, 605, 658
Foreign	25, 655	23, 891	24, 538	26, 439	31, 709	33, 928	37, 008	39, 769	32, 836	30, 589	32, 225	29, 989	368, 576
Runs to stills:													
Domestic	231, 178	202, 777	225, 368	206, 312	216, 715	202, 724	207, 288	212, 089	205, 381	207, 072	199, 498	213, 270	2, 529, 672
Foreign	25, 307	23, 684	24, 077	25, 885	31, 045	33, 278	36, 124	38, 758	32, 225	30, 071	31, 275	29, 035	360, 764
Exports [2]	7, 460	8, 009	14, 100	9, 013	3, 703	1, 745	1, 197	995	739	1, 007	926	1, 088	49, 982
Transfers:													
Distillate	132	114	131	122	122	107	109	96	100	92	91	89	1, 305
Residual	834	728	997	1, 115	1, 087	1, 081	1, 404	1, 498	1, 070	985	1, 538	1, 547	13, 884
Losses	1, 994	1, 713	2, 294	615	778	963	456	1, 735	2, 155	1, 549	2, 129	2, 246	18, 627

[1] Bureau of Mines.
[2] U. S. Department of Commerce, except Alaska and Hawaii, which are Bureau of Mines data.
[3] Preliminary figures.

TABLE 8.—Petroleum produced in the United States, 1953–57, and total 1859–1957, by States [1]

(Thousand barrels)

	1953	1954	1955	1956	1957 [2]	1859–1957 (total)
Production:						
Alabama	1, 694	1, 584	1, 411	3, 069	5, 366	18, 052
Arkansas	29, 681	29, 130	28, 369	29, 355	30, 597	1, 002, 609
California	365, 085	355, 865	354, 812	350, 754	339, 646	11, 099, 696
Colorado	36, 402	46, 206	52, 653	58, 516	54, 867	452, 207
Florida	543	548	495	479	461	5, 288
Illinois	59, 026	66, 798	81, 423	82, 346	78, 278	1, 994, 706
Indiana	12, 823	11, 204	10, 988	11, 513	12, 859	283, 348
Kansas	114, 566	119, 317	121, 669	124, 204	121, 705	[3] 2, 956, 868
Kentucky	11, 518	13, 791	15, 518	17, 628	16, 879	[4] 350, 899
Louisiana	256, 632	246, 558	271, 010	299, 421	323, 199	4, 431, 269
Michigan	12, 285	12, 028	11, 266	10, 740	10, 169	[5] 405, 914
Mississippi	35, 620	34, 240	37, 741	40, 824	39, 202	544, 574
Montana	11, 920	14, 195	15, 654	21, 760	27, 215	277, 518
Nebraska	6, 344	7, 783	11, 203	16, 204	19, 586	72, 373
Nevada	----------	33	64	64	44	205
New Mexico	70, 441	74, 820	82, 958	87, 893	94, 759	[6] 1, 204, 106
New York	3, 800	3, 257	2, 904	2, 748	2, 677	[7] 190, 483
North Dakota	5, 183	6, 025	11, 143	13, 495	13, 642	51, 062
Ohio	3, 610	3, 880	4, 353	4, 785	5, 478	649, 559
Oklahoma	202, 570	185, 851	202, 817	215, 862	215, 111	7, 635, 144
Pennsylvania	10, 649	9, 107	8, 531	8, 230	8, 179	1, 202, 739
Texas	1, 019, 164	974, 275	1, 053, 297	1, 107, 808	1, 083, 812	20, 999, 047
Utah	1, 807	1, 905	2, 227	2, 466	4, 093	[8] 17, 252
West Virginia	3, 038	2, 902	2, 320	2, 179	2, 215	458, 973
Wyoming	82, 618	93, 533	99, 483	104, 830	106, 616	1, 540, 871
Other States [9]	63	153	119	110	123	2, 525
Total	2, 357, 082	2, 314, 988	2, 484, 428	2, 617, 283	2, 616, 778	57, 847, 287
Value at wells:						
Total (thousand dollars)	6, 327, 100	6, 424, 930	6, 870, 380	7, 296, 760	8, 079, 504	104, 765, 172
Average per barrel	$2. 68	$2. 78	$2. 77	$2. 79	$3. 09	$1. 81

[1] For detailed figures by States, 1859–1935, see Minerals Yearbook, 1937, p. 1008.
[2] Preliminary figures.
[3] Oklahoma included with Kansas in 1905 and 1906.
[4] Includes Tennessee, 1883–1907.
[5] Figures represent 1925–57 production only; earlier years included under "Other States."
[6] Figures represent 1924–57 production only; earlier years included under "Other States."
[7] Early production in New York included with Pennsylvania.
[8] Figures represent 1946–57 production only; earlier years included under "Other States."
[9] Includes Alaska, 1912–33; Arkansas, 1920; Michigan, 1900–19; Mississippi, 1933–35; Missouri, 1899–1911, 1913–16, 1919–23, 1932–57; New Mexico, 1913, 1919–23; South Dakota, 1955–57; Tennessee, 1916–57; Utah, 1907–11, 1920, 1924–41; Virginia, 1943–57.

PRODUCTION

General

Production of crude petroleum in 1957 totaled 2,617 million barrels, an average of 7,169 thousand barrels daily—about equal to the previous crude-oil-production record established in 1956.

For the first 6 months of 1957 daily production of crude oil averaged 7,492 thousand barrels. With reopening of the Suez Canal in May, Europe no longer depended upon the United States for crude oil, and exports dropped back to normal. In June crude-oil stocks reached exceedingly high levels, and daily production in the last 6 months was cut back to 6,852 barrels.

The States producing more than 100 million barrels each in 1957 were Texas, California, Louisiana, Oklahoma, Kansas, and Wyoming, and their output represented 83.4 percent of the United States total. In 1956 production from these States comprised 84.2 percent of the total. Louisiana and Wyoming were the only States in this group that reported gains in 1957.

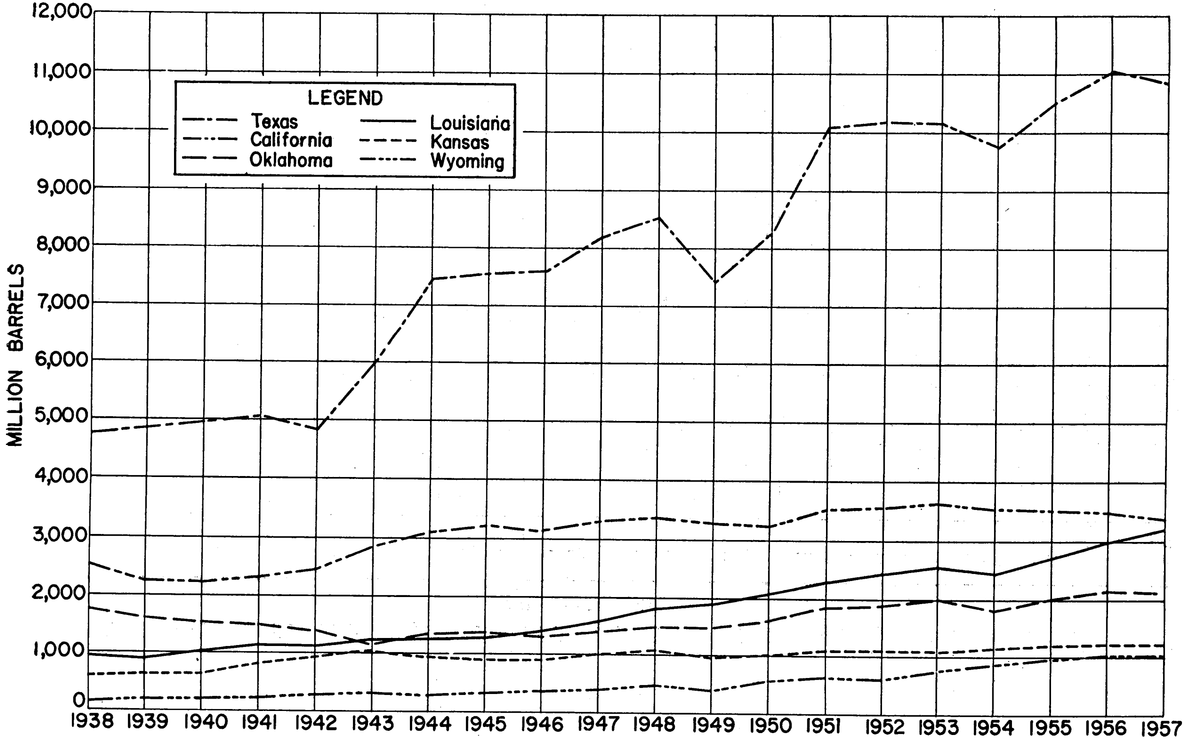

FIGURE 2.—Production of crude petroleum in the United States, 1938–57, by principal producing States.

TABLE 9.—Production of crude petroleum in the United States in 1956–57, by States and months

(Thousand barrels)

State	January	February	March	April	May	June	July	August	September	October	November	December	
1956													
Alabama	151	142	175	198	237	257	292	336	281	301	341	358	3,069
Arkansas	2,356	2,247	2,434	2,379	2,478	2,452	2,502	2,560	2,394	2,468	2,508	2,577	29,355
California [1]	30,077	28,159	29,918	28,955	29,899	28,827	29,694	29,611	28,602	29,399	28,468	29,145	350,754
Colorado [2]	4,883	4,690	4,951	4,906	5,175	4,925	4,951	4,844	4,752	4,835	4,665	4,939	58,516
Florida	43	39	43	40	40	39	41	40	38	39	38	39	479
Illinois	6,964	6,502	7,043	6,817	7,067	6,724	6,856	6,990	6,568	7,107	6,751	6,957	82,346
Indiana	848	817	879	828	982	940	974	901	1,069	1,044	1,051	1,180	11,513
Kansas	10,585	9,865	10,838	10,396	10,416	10,345	10,524	10,775	9,950	10,184	9,986	10,340	124,204
Kentucky	1,461	1,410	1,487	1,430	1,497	1,444	1,477	1,471	1,378	1,533	1,492	1,548	17,628
Louisiana	24,636	23,346	25,463	24,842	24,757	24,044	24,297	24,619	23,563	24,667	25,543	29,644	299,421
Michigan [3]	924	858	915	884	939	869	908	917	845	929	859	893	10,740
Mississippi	3,485	3,318	3,554	3,277	3,376	3,360	3,423	3,442	3,324	3,410	3,338	3,517	40,824
Montana [4]	1,705	1,577	1,786	1,692	1,781	1,798	1,911	1,824	1,734	1,855	1,971	2,126	21,760
Nebraska	1,126	1,165	1,345	1,317	1,348	1,358	1,436	1,370	1,358	1,459	1,333	1,589	16,204
New Mexico	7,674	6,805	7,563	7,103	7,173	7,025	7,273	7,413	7,298	7,522	7,302	7,742	87,893
New York	231	222	224	227	240	226	231	239	210	244	223	231	2,748
North Dakota	1,374	1,035	1,300	892	849	1,086	1,175	1,197	1,121	933	1,241	1,292	13,495
Ohio	382	365	379	385	403	380	412	424	403	456	406	390	4,785
Oklahoma	18,778	17,919	19,324	17,880	17,850	17,529	17,980	18,005	17,485	17,141	17,075	18,896	215,862
Pennsylvania	715	615	658	650	732	704	693	721	654	733	672	683	8,230
Texas	95,400	89,260	96,058	90,665	92,512	89,623	93,466	95,864	89,666	90,012	90,155	95,127	1,107,808
Utah	205	186	161	145	163	143	192	277	233	249	246	266	2,466
West Virginia	178	180	182	177	195	185	183	193	171	194	176	165	2,179
Wyoming	8,930	8,341	8,950	8,313	8,816	8,712	8,864	8,987	8,474	8,842	8,585	9,016	104,830
Other States	14	15	15	14	17	15	15	15	14	14	13	13	[5] 174
Total: 1956	223,125	209,078	225,645	214,412	218,942	213,010	219,770	223,035	211,585	215,570	214,438	228,673	2,617,283
1955	209,601	191,342	213,453	206,668	207,067	197,844	205,614	206,619	202,037	211,866	210,454	221,863	2,484,428
Daily average, 1956	7,198	7,210	7,279	7,147	7,063	7,100	7,089	7,195	7,053	6,954	7,148	7,377	7,151
Pennsylvania Grade (included above)	1,230	1,124	1,171	1,165	1,283	1,223	1,223	1,270	1,141	1,303	1,189	1,190	14,512

1957[6]													
Alabama	354	330	408	452	488	488	516	450	462	471	457	490	5,366
Arkansas	2,606	2,496	[illegible]	2,547	2,593	2,483	2,520	2,510	2,521	2,564	2,530	2,560	30,597
California	29,099	26,316	28,832	27,876	28,742	27,749	28,811	28,836	28,022	28,735	27,894	28,734	339,646
Colorado	4,915	4,446	4,866	4,646	4,743	4,399	4,645	4,591	4,449	4,467	4,286	4,414	54,867
Florida	39	35	38	38	42	36	38	39	39	38	40	39	461
Illinois	7,010	6,146	6,515	6,472	6,855	5,267	5,660	5,865	6,826	7,346	6,925	7,391	78,278
Indiana	1,117	1,037	1,113	1,100	1,144	1,045	1,013	1,044	1,061	1,092	1,014	1,079	12,859
Kansas	10,339	9,387	9,640	10,076	10,605	9,999	10,389	10,177	9,692	10,974	9,802	10,625	121,705
Kentucky	1,440	1,316	1,424	1,403	1,431	1,364	1,477	1,442	1,385	1,458	1,322	1,417	16,879
Louisiana	30,906	28,723	31,041	29,147	29,148	24,896	26,545	24,453	23,761	24,660	23,985	25,934	323,199
Michigan	885	807	856	868	886	822	897	850	836	869	784	809	10,169
Mississippi	3,487	3,285	3,417	3,506	3,561	3,236	3,167	2,896	2,951	3,884	2,866	2,946	39,202
Montana	2,123	1,984	2,251	2,173	2,277	2,273	2,380	2,393	2,318	2,357	2,280	2,406	27,215
Nebraska	1,462	1,413	1,610	1,543	1,491	1,505	1,632	1,798	1,740	1,785	1,775	1,832	19,586
New Mexico	7,937	7,464	8,498	7,938	8,001	7,453	7,956	7,953	7,384	7,958	7,986	8,231	94,759
New York	218	211	223	235	243	215	238	226	218	227	207	216	2,677
North Dakota	1,296	1,114	1,408	904	1,237	1,199	1,247	1,248	824	885	1,065	1,215	13,642
Ohio	406	388	401	436	443	413	509	463	488	530	482	519	5,478
Oklahoma	19,027	18,011	20,224	18,589	18,624	16,423	17,287	17,295	16,727	17,736	17,091	18,077	215,111
Pennsylvania	697	649	698	707	746	680	719	696	652	692	620	623	8,179
Texas	96,730	90,243	103,597	96,606	97,611	92,498	85,920	85,569	84,713	83,501	81,609	85,215	1,083,812
Utah	333	289	380	296	241	264	303	323	357	418	370	519	4,093
West Virginia	181	168	175	186	191	173	200	188	184	200	182	187	2,215
Wyoming	9,262	8,737	8,922	8,476	9,105	8,312	8,690	8,728	8,969	9,245	8,894	9,276	106,616
Other States	11	11	10	11	10	10	12	10	11	14	18	39	[7] 167
Total: 1957	231,880	215,006	239,214	226,231	230,458	213,202	212,771	210,043	206,590	212,106	204,484	214,793	2,616,778
1956	223,125	209,078	225,645	214,412	218,942	213,010	219,770	223,035	211,585	215,570	214,438	228,673	2,617,283
Daily average, 1957	7,480	7,679	7,717	7,541	7,434	7,107	6,864	6,776	6,886	6,842	6,816	6,929	7,169
Pennsylvania Grade (included above)	1,210	1,140	1,210	1,257	1,315	1,180	1,309	1,219	1,179	1,265	1,133	1,153	14,570

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[1] American Petroleum Institute.
[2] Colorado Oil and Gas Conservation Commission.
[3] Michigan Department of Conservation.
[4] Montana Oil Conservation Board.
[5] Missouri (65), Nevada (64), South Dakota (32), Tennessee (9), and Virginia (4).
[6] Preliminary figures.
[7] Missouri (53), Nevada (27), South Dakota (51), Tennessee (8), and Virginia (6).

TABLE 10.—Percentage of total crude petroleum produced in the United States, 1948–57, by States

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957 [1]
Texas	44.7	40.4	42.1	45.0	44.6	43.2	42.1	42.4	42.3	41.4
California	16.8	18.1	16.6	15.8	15.7	15.5	15.4	14.3	13.4	13.0
Louisiana	9.0	10.4	10.6	10.3	10.7	10.9	10.6	10.9	11.4	12.4
Oklahoma	7.7	8.2	8.3	8.3	8.3	8.6	8.0	8.2	8.2	8.2
Kansas	5.5	5.5	5.5	5.1	5.0	4.9	5.2	4.9	4.7	4.7
Wyoming	2.7	2.6	3.1	3.1	3.0	3.5	4.0	4.0	4.0	4.1
New Mexico	2.4	2.6	2.4	2.3	2.6	3.0	3.2	3.3	3.4	3.6
Illinois	3.2	3.5	3.1	2.7	2.6	2.5	2.9	3.3	3.1	3.0
Colorado	.9	1.3	1.2	1.2	1.3	1.5	2.0	2.1	2.2	2.1
Mississippi	2.3	2.1	1.9	1.7	1.6	1.5	1.5	1.5	1.6	1.5
Arkansas	1.6	1.6	1.6	1.3	1.3	1.3	1.3	1.1	1.1	1.2
Montana	.5	.5	.4	.4	.4	.5	.6	.6	.8	1.0
Kentucky	.4	.5	.5	.5	.5	.5	.6	.6	.7	.6
Michigan	.8	.9	.8	.6	.6	.5	.5	.5	.4	.4
Other States	1.5	1.8	1.9	1.7	1.8	2.1	2.1	2.3	2.7	2.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Preliminary figures.

TABLE 11.—Production of crude petroleum in leading fields in the United States, 1956–57, and total production since discovery [1] in thousand barrels

[Oil and Gas Journal]

Field	State	1956	1957	Total since discovery [2]
East Texas	Texas	64,838	69,067	3,293,758
Wilmington	California	36,888	32,371	799,725
Sho-Vel-Tum	Oklahoma	29,717	29,008	472,886
Rangely	Colorado	28,302	26,154	243,900
Kelly-Snyder	Texas	25,103	25,142	192,731
Ventura	California	24,372	21,955	582,930
Coalinga Nose, Coalinga East	do	16,497	21,843	596,194
Huntington Beach	do	22,536	21,514	613,461
Goldsmith (all fields)	Texas	18,647	19,831	239,706
South Pass, Block 24	Louisiana	16,362	18,999	52,713
Golden Trend	Oklahoma	20,204	17,245	152,977
Cowden, North and South	Texas	16,634	15,348	280,177
Midway-Sunset	California	15,131	15,284	843,401
Hawkins	Texas	12,025	14,773	226,881
Wasson—66 and 72	do	15,689	14,655	319,003
Burbank	Oklahoma	13,519	14,280	334,020
Elk Basin and South	Montana, Wyoming	11,861	13,793	123,763
Cuyama, South	California	12,825	13,133	102,023
Eunice-Monument	New Mexico	10,527	12,817	292,624
Spraberry Trend Area	Texas	21,100	12,636	150,872
San Ardo	California	11,732	11,862	68,836
Loudon	Illinois	9,828	11,691	209,547
Caillou Island	Louisiana	9,849	11,661	116,916
Slaughter	Texas	11,104	10,863	243,651
Ward-Estes, North	do	5,440	10,582	71,976
Levelland	do	8,826	10,392	103,188
Lake Washington	Louisiana	7,533	10,228	31,172
McElroy	Texas	9,636	10,043	157,851
Katy, North	do	9,353	9,652	106,116
Webster	do	10,508	9,547	232,164
Denton	New Mexico	10,778	9,391	56,444
Hastings	Texas	11,410	9,374	285,483
Bradford-Allegheny [3]	Pennsylvania-New York	9,184	9,125	676,261
Yates	Texas	9,690	8,882	449,588
Diamond M	do	9,404	8,629	77,663
Weeks Island	Louisiana	8,474	8,628	75,263
Tom O'Connor	Texas	9,461	8,604	233,098
Beaver Lodge	North Dakota	10,413	8,560	39,729
Timbalier Bay	Louisiana	5,301	8,464	25,805
Seeligson (all zones)	Texas	9,604	8,440	161,419
Thompson, North and South	do	9,032	8,269	221,423
Clay City	Illinois	9,210	8,187	195,943
Van	Texas	5,824	7,754	273,176
Midland Farms	do	6,105	7,523	51,657
Pierce Junction	do	5,339	7,408	71,923
Buena Vista	California	7,756	7,407	463,264
Kern Bluff, Front and River	do	7,434	7,296	430,015

See footnotes at end of table.

TABLE 11.—Production of crude petroleum in leading fields in the United States, 1956–57, and total production since discovery [1] in thousand barrels—Continued

[Oil and Gas Journal]

Field	State	1956	1957	Total since discovery [2]
Caddo	Louisiana	8, 417	7, 275	238, 503
Russell and North	Texas	7, 266	7, 208	30, 736
Keystone	do	7, 505	7, 028	152, 918
Delhi-Big Creek	Louisiana	6, 764	7, 003	94, 216
Brea-Olinda	California	6, 878	6, 866	257, 918
Sand Hills	Texas	6, 788	6, 791	29, 256
Aqua Dulce-Stratton	do	7, 055	6, 786	141, 352
Kong Beach	California	7, 772	6, 772	805, 929
Means	Texas	5, 120	6, 761	38, 516
South Mountain	California	5, 004	6, 577	66, 110
Howard Glasscock	Texas	7, 308	6, 487	192, 789
Cogdell	do	6, 861	6, 428	53, 530
Conroe and West	do	9, 774	6, 412	368, 546
Caprock	New Mexico	6, 942	6, 362	27, 257
West Ranch	Texas	6, 279	6, 176	109, 197
Hamilton Dome	Wyoming	5, 418	6, 251	50, 388
Coles Levee, North and South	California	6, 201	5, 891	111, 934
Block 31	Texas	5, 739	5, 793	42, 718
TXL	do	5, 759	5, 780	136, 284
Elk Hills	California	5, 993	5, 698	242, 089
Salem	Illinois	6, 606	5, 644	258, 082
Bemis-Shutts [4]	Kansas	3, 076	5, 628	155, 383
Adena	Colorado	5, 709	5, 518	21, 849
Venice	Louisiana	4, 919	5, 456	72, 026
Prentice	Texas	5, 918	5, 441	24, 869
Emma and Triple N	do	3, 848	5, 429	23, 840
Hull-Merchant	do	6, 058	5, 278	141, 974
Anahuac	do	4, 900	5, 271	142, 618
Oregon Basin, North and South	Wyoming	5, 979	5, 204	82, 491
Hackberry, West	Louisiana	4, 545	5, 161	55, 123
Old Ocean	Texas	5, 822	5, 026	102, 915
Fullerton, North and South	do	6, 434	5, 022	123, 202
Baxterville	Mississippi	5, 958	5, 275	61, 352

[1] Fields under 5,000,000 barrels not shown for current year.

[2] Includes revisions.

[3] Bureau of Mines data.

[4] Bemis-Shutts field includes Burnett; Burnett, Northwest; Pleasant Ridge, Southwest; and Walters, consolidated in 1957.

By States

Additional data on crude production will be found in volume III of the Minerals Yearbook.

TABLE 12.—Production of crude petroleum in Arkansas, 1953–57, by fields

(Thousand barrels)

Field	1953	1954	1955	1956	1957 [1]
Atlanta	649	554	483	438	399
Bradley West	----	----	----	499	(2)
Buckner	645	529	478	444	415
Dorchear-Macedonia	841	624	617	632	721
El Dorado	711	838	857	923	990
Fouke	1, 429	1, 210	1, 241	1, 431	1, 468
Horsehead	194	706	816	403	188
Magnolia	4, 029	3, 289	2, 890	3, 609	4, 521
McKamie	1, 369	1, 480	1, 331	1, 349	1, 337
Midway	2, 642	2, 262	2, 048	2, 238	2, 299
Shuler	2, 318	2, 599	2, 593	2, 353	2, 119
Smackover	3, 892	4, 370	4, 678	4, 466	4, 206
Stephens	1, 223	1, 077	1, 014	1, 157	1, 745
Village	840	850	846	811	776
Wesson	3, 296	2, 699	1, 840	1, 591	2, 491
Other fields [2]	5, 603	6, 043	6, 637	7, 011	6, 922
Total Arkansas	29, 681	29, 130	28, 369	29, 355	30, 597

[1] Preliminary figures.

[2] Includes oil consumed on leases and net change in stocks held on leases for entire State.

TABLE 13.—Production of crude petroleum in California, 1953–57, by districts and fields, in thousand barrels

[American Petroleum Institute]

District and field	1953	1954	1955	1956	1957
San Joaquin Valley:					
Belridge	3, 567	4, 015	4, 092	4, 297	4, 677
Buena Vista	8, 881	7, 962	7, 713	7, 767	7, 457
Coalinga	28, 356	27, 575	29, 661	29, 280	27, 746
Coles Levee	6, 785	6, 462	6, 585	5, 313	5, 888
Cuyama-Russell Ranch	17, 409	16, 769	16, 132	15, 940	16, 215
Edison	5, 057	4, 419	4, 951	4, 568	4, 135
Elk Hill	5, 960	7, 696	6, 689	5, 959	5, 662
Fruitvale	3, 562	3, 576	3, 399	3, 212	2, 994
Gosford, East	652	488	425	443	----------
Greeley	4, 769	4, 531	4, 355	4, 271	3, 502
Helm	540	555	512	1, 009	981
Kern River-Kern Bluff-Kern Front	7, 500	5, 610	5, 921	7, 437	7, 665
Kettleman North Dome	6, 657	6, 041	5, 447	5, 252	4, 898
Lost Hills	2, 317	1, 982	1, 842	1, 782	1, 706
McKitterick	8, 621	7, 764	8, 503	8, 984	7, 807
Midway-Sunset	12, 512	13, 362	14, 707	15, 070	15, 206
Mountain View	1, 372	1, 356	1, 554	1, 447	1, 608
Mount Poso	3, 100	3, 078	3, 161	2, 927	3, 319
Poso Creek	1, 767	1, 323	1, 285	1, 517	1, 655
Raisin City	1, 854	1, 944	1, 916	2, 137	1, 951
Rio Bravo	4, 415	4, 313	4, 563	3, 995	4, 262
Riverdale	677	611	529	544	540
Round Mountain	1, 915	1, 793	1, 681	1, 630	1, 590
Tejon Group	2, 366	2, 418	3, 915	3, 360	2, 331
Ten Section	1, 472	1, 438	1, 650	1, 638	1, 577
Other San Joaquin Valley	9, 006	9, 615	9, 037	11, 702	10, 421
Total San Joaquin Valley	151, 089	146, 696	150, 225	151, 481	145, 793
Coastal district:					
Aliso Canyon	2, 640	2, 790	2, 845	2, 606	2, 343
Cat Canyon	6, 992	6, 065	5, 382	6, 133	4, 481
Del Valle	995	1, 070	926	747	1, 140
Elwood	1, 569	1, 436	1, 291	1, 205	1, 050
Gato Ridge	1, 012	973	947	966	890
Lompoc	1, 697	1, 493	1, 247	1, 047	886
Newall-Potrero	3, 314	3, 558	3, 612	3, 459	3, 199
Orcutt	1, 354	1, 265	1, 231	1, 144	1, 099
Padre Canyon [1]	1, 726	1, 736	1, 577	1, 346	----------
Placerita	2, 756	2, 171	1, 834	1, 590	1, 458
Romona	1, 047	863	724	612	----------
Rincon	1, 457	1, 517	1, 632	3, 079	3, 204
San Ardo	11, 284	11, 172	10, 972	11, 733	11, 845
San Miguelito	3, 134	1, 990	1, 835	1, 648	2, 346
San Maria	4, 191	3, 680	3, 012	2, 713	2, 544
South Mountain	4, 594	5, 261	4, 676	4, 995	6, 561
Ventura	29, 901	31, 129	25, 603	24, 357	21, 159
Zaca Creek	1, 653	1, 709	1, 317	953	780
Other Coastal	12, 625	12, 720	14, 208	12, 500	20, 188
Total Coastal	93, 941	92, 598	84, 871	82, 833	85, 173
Los Angeles Basin:					
Brea Olinda	8, 574	8, 314	7, 498	6, 864	6, 850
Coyote	5, 655	5, 087	4, 495	4, 498	4, 471
Dominquez	3, 658	3, 421	3, 448	4, 366	3, 992
Huntington Beach	21, 139	21, 556	24, 107	22, 468	21, 452
Inglewood	4, 950	4, 778	4, 374	4, 466	4, 642
Long Beach	7, 422	7, 739	9, 948	7, 748	6, 761
Montebello	1, 767	1, 575	1, 559	1, 518	1, 450
Newport	1, 546	1, 555	1, 671	1, 546	1, 507
Richfield	2, 628	2, 738	2, 495	2, 290	2, 112
Rosecrans [2]	1, 478	1, 360	1, 281	1, 185	1, 119
Sansinena	2, 800	3, 062	3, 827	3, 798	3, 646
Santa Fe Springs	5, 315	5, 141	4, 591	5, 193	4, 444
Seal Beach	3, 852	3, 545	3, 634	3, 946	4, 037
Torrance	2, 564	2, 526	2, 573	2, 614	2, 715
Wilmington	44, 328	41, 540	38, 860	36, 844	32, 306
Other Los Angeles Basin	2, 379	2, 634	5, 355	7, 096	7, 176
Total Los Angeles Basin	120, 055	116, 571	119, 716	116, 440	108, 680
Total California	365, 085	355, 865	354, 812	350, 754	339, 646

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[1] Includes Oak Grove area.

[2] Includes Athens.

TABLE 14.—Production of crude petroleum in Colorado, 1953–57, by fields

(Thousand barrels)

Field [1]	1953	1954	1955	1956	1957 [2]
Adena	24	4,626	6,015	5,709	5,518
Badger Creek—West	455	1,033	747	518	498
Big Beaver	----------	137	825	876	896
Black Hollow	56	500	783	676	656
Bobcat	----------	496	1,200	884	625
Cliff	----------	----------	820	979	565
Divide	----------	416	677	405	----------
Graylin—South and Northwest	364	1,996	1,588	1,051	690
Lewis Creek	157	782	674	456	----------
Little Beaver—East	2,539	2,687	2,089	1,993	2,282
Mount Hope—East and North	1,125	892	1,024	840	566
Plum Bush Creek	----------	2	665	1,232	1,062
Rangely	22,900	22,780	23,901	28,302	26,154
Sand River	----------	187	560	483	----------
Wilson Creek	2,854	2,640	2,440	2,556	2,528
Yenter	1,503	1,120	904	647	621
Other [3]	4,425	5,912	7,741	10,909	12,206
Total Colorado	36,402	46,206	52,653	58,516	54,867

[1] Figures by fields supplemented by data from Oil and Gas Journal for 1957.

[2] Preliminary figures.

[3] Includes crude oil consumed on leases and net change in stocks held on leases for entire State.

TABLE 15.—Production of crude petroleum in Illinois, 1953–57, by fields, in thousand barrels

[Oil and Gas Journal]

Field	1953	1954	1955	1956	1957
Albion	1,162	1,088	1,232	1,120	1,313
Benton	2,441	1,740	1,462	1,032	807
Boyd	539	533	718	899	952
Bridgeport	2,531	2,747	3,417	4,352	4,174
Centralia	701	634	563	546	2,076
Clay City	8,065	9,526	10,300	9,210	8,187
Dale	2,053	1,808	1,912	3,543	2,441
East Inman	539	461	1,067	1,513	1,415
Johnsonville	588	588	839	1,063	1,010
Louden	5,249	6,486	7,535	9,828	11,691
New Harmony	3,491	4,736	4,440	4,022	3,462
Phillipstown	989	868	979	1,168	547
Robinson	2,045	2,377	2,606	2,621	2,752
Roland	489	1,093	2,045	2,503	2,449
Sailor Springs	1,192	1,473	1,544	1,794	1,552
Salem	2,541	4,981	7,673	6,606	5,644
Other fields [1]	24,411	25,659	33,091	30,526	27,806
Total Illinois	59,026	66,798	81,423	82,346	78,278

[1] Bureau of Mines figures.

TABLE 16.—Production of crude petroleum in Kansas, 1953–57, by fields, in thousand barrels

[Oil and Gas Journal]

Field	1953	1954	1955	1956	1957 [1]
Bemis-Shutts	3, 526	3, 549	3, 263	3, 076	5, 628
Bloomer	2, 067	1, 589	1, 456	1, 268	1, 162
Burnett-Southwest	2, 303	2, 170	2, 464	2, 230	-----------
Burrton-Haury	781	809	732	695	668
Chase [2]	6, 007	5, 339	4, 897	4, 689	4, 578
El Dorado	3, 939	3, 864	4, 242	4, 348	4, 672
Fairport	834	823	903	964	1, 054
Genesco-Edwards	3, 061	2, 869	2, 941	2, 734	2, 222
Gladys	(3)	(3)	1, 024	1, 885	1, 832
Gorham	1, 793	1, 692	1, 589	1, 543	1, 308
Hall Gurney	4, 640	4, 528	4, 064	3, 587	3, 580
Iuka-Carmi	1, 314	1, 421	1, 464	1, 486	1, 141
Kraft-Prusa	4, 721	4, 357	3, 826	3, 498	3, 238
Marcotte	1, 831	1, 681	1, 712	1, 621	2, 061
Morel	1, 798	1, 654	1, 470	1, 461	1, 623
Ray	1, 393	1, 280	1, 312	1, 225	1, 320
Seeley-Wick	1, 753	1, 798	1, 479	1, 341	987
Silica-Raymond	(2)	(2)	(2)	(2)	(2)
Stoltenberg	1, 270	1, 119	1, 043	951	1, 205
Thrall-Agard	1, 121	1, 002	775	748	599
Trapp	6, 081	5, 461	4, 943	4, 427	3, 883
Welch-Bornholdt	1, 259	1, 361	1, 254	1, 108	1, 024
Other fields [4]	63, 767	70, 951	74, 816	79, 319	77, 920
Total Kansas	115, 259	119, 317	121, 669	124, 204	121, 705

[1] Preliminary figures.
[2] Silica included with Chase.
[3] Included with "Other fields."
[4] Bureau of Mines figures.

TABLE 17.—Production of crude petroleum in Louisiana, 1953–57, by districts and fields

(Thousand barrels)

District and field	1953	1954	1955	1956	1957 [1]
Gulf Coast:					
Anse la Butte	2, 165	1, 699	1, 719	1, 890	2, 065
Avery Island	3, 111	2, 724	3, 499	3, 303	3, 240
Bateman Lake	-----------	-----------	-----------	1, 718	2, 120
Barataria	2, 351	1, 628	1, 358	1, 103	1, 023
Bay de Chene	1, 302	1, 208	1, 456	1, 609	1, 794
Bay Marchand	1, 560	2, 430	2, 933	3, 539	3, 791
Bay St. Elaine	3, 194	3, 130	3, 315	3, 188	3, 376
Bayou Blue	1, 158	1, 060	955	931	1, 133
Bayou Choctaw	893	1, 171	1, 293	1, 176	1, 204
Bayou Mallett	1, 796	1, 413	1, 140	1, 043	823
Bayou Sale	4, 710	3, 589	3, 090	2, 825	2, 712
Bully Camp	1, 640	1, 353	1, 767	1, 623	1, 582
Caillou Island	8, 540	8, 398	9, 017	9, 626	11, 298
Charenton	1, 278	1, 223	1, 234	1, 426	1, 391
Cox Bay	2, 700	3, 413	3, 113	2, 762	2, 303
Delta Farms	6, 480	5, 456	4, 810	4, 493	4, 010
Dog Lake	1, 530	1, 270	1, 072	947	887
Duck Lake	2, 935	3, 199	3, 329	2, 916	2, 477
East White Lake	1, 479	1, 179	1, 390	1, 390	1, 463
Egan	2, 017	2, 117	2, 225	2, 529	2, 263
Erath	1, 370	1, 152	964	919	1, 310
Garden Island	1, 590	1, 419	1, 343	1, 340	1, 429
Gibson	1, 410	1, 140	1, 020	919	910
Golden Meadows	3, 918	3, 974	3, 784	3, 452	3, 032
Good Hope	2, 045	1, 446	1, 208	1, 087	1, 058
Grand Bay	3, 768	3, 519	3, 403	4, 030	4, 113
Gueydan	1, 570	1, 298	1, 076	963	961
Hackberry	4, 512	4, 215	4, 451	5, 927	6, 903
Horseshoe Bayou	1, 394	1, 097	871	836	807
Iberia	-----------	-----------	-----------	800	814
Iowa	2, 842	2, 701	2, 465	2, 214	2, 006
Jeanerette	1, 137	1, 228	1, 193	1, 148	1, 271
Jennings	-----------	-----------	-----------	1, 024	1, 247

See footnotes at end of table.

TABLE 17.—Production of crude petroleum in Louisiana, 1953–57, by districts and fields—Continued

[Oil and Gas Journal]

District and field	1953	1954	1955	1956	1957
Gulf Coast—Continued					
Lafitte	4,650	3,686	3,323	2,935	3,058
Lake Arthur South				1,097	1,024
Lake Barre	599	1,056	1,363	1,723	2,066
Lake Chicot	1,072	1,021	1,031	1,009	954
Lake Fausse Point	576	823	1,344	1,499	1,750
Lake Pelto	2,697	2,324	2,421	2,652	2,951
Lake Salvador	1,831	1,415	1,370	1,391	1,641
Lake Washington	951	1,947	4,697	7,849	11,089
La Rose				1,095	1,009
Leeville	3,251	3,556	4,088	4,094	4,033
Little Lake	823	1,582	2,147	2,353	2,453
Lockport				908	920
Main Pass	4,287	4,981	6,354	8,417	11,064
North Crowley	1,504	1,273	1,299	1,168	1,107
Paradis	3,445	3,379	3,172	2,843	2,625
Phoenix Lake	1,781	1,778	1,533	1,367	1,228
Pine Prairie	955	864	885	927	826
Point-a-la-Hache	2,689	2,451	2,168	1,999	1,884
Port Barre	1,327	1,056	925	852	763
Quarentine Bay	3,151	2,649	3,151	3,964	3,536
Romere Pass	4,570	4,719	3,913	3,485	3,488
St. Gabriel	1,778	1,278	1,047	825	731
Section 28	1,244	1,335	1,359	1,396	1,336
Shuteston				1,025	905
South Pass				8,208	9,301
Tepetate	2,149	1,722	1,692	1,706	1,580
Timbalier Bay	2,514	2,289	3,935	6,120	8,600
University	1,534	1,391	1,073	934	822
Valentine	1,252	1,379	1,684	1,802	1,688
Venice	5,728	5,364	4,903	5,117	5,514
Ville Platte	1,333	1,402	1,249	1,150	996
Vinton	3,618	2,712	2,352	2,203	2,061
Weeks Island	11,258	9,029	8,210	8,668	8,602
West Bay	3,132	2,525	2,423	3,326	4,016
West Cote Blanche	2,865	2,380	2,016	1,891	2,022
West Lake Verrett	1,757	1,517	1,332	1,361	1,333
White Castle	1,343	941	763	786	966
Other Gulf Coast [2]	56,071	58,048	77,694	77,653	90,314
Total Gulf Coast	214,130	204,721	227,409	252,494	277,072
Northern:					
Big Creek	1,279	900	750	679	587
Caddo	5,438	8,251	9,111	8,417	7,305
Cotton Valley				1,407	945
Delhi	5,916	4,880	5,377	6,301	6,411
Esperance Point				1,684	1,621
Haynesville	4,445	3,694	3,234	2,859	2,695
Lake St. John	4,015	3,162	2,788	2,430	2,258
Nebo [3]	2,268	2,270	2,193	1,905	1,746
Olla [4]	2,106	1,934	1,709	1,626	1,432
Rodessa	868	784	793	751	710
Sligo	879	966	1,030	1,043	1,340
Urania				786	765
Othern Northern [2]	15,288	14,996	16,616	17,039	18,312
Total Northern	42,502	41,837	43,601	46,927	46,127
Total Louisiana	256,632	246,558	271,010	299,421	323,199

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[1] Preliminary figures

[2] Includes crude oil consumed on leases and net change in stocks held on leases for entire district.

[3] Includes Hemphill, Trout Creek, and Jena.

[4] Includes Little Creek and Summerville.

TABLE 18.—Production of crude petroleum in Michigan, 1953–57, by fields, in thousand barrels

[Michigan Department of Conservation]

Field	1953	1954	1955	1956	1957[1]
Beaver Creek	421	342	298	291	242
Coldwater	1,253	1,160	1,052	923	800
Deep River	1,774	1,569	1,180	875	576
East Norwich	488	462	415	402	361
Kawkawlin	480	447	400	434	595
Kimball Lake	288	194	115	57	42
Pentwater	383	274	219	197	165
Reed City and East Reed City	495	482	477	443	480
Rose City	599	553	464	392	302
St. Helen	307	238	223	209	174
Stony Lake	659	561	420	347	247
Other fields	5,138	5,746	6,003	6,170	6,185
Total Michigan	12,285	12,028	11,266	10,740	10,169

[1] Preliminary figures.

TABLE 19.—Production of crude petroleum in Mississippi, 1953–57, by fields

(Thousand barrels)

Field	1953	1954	1955	1956	1957[1]
Baxterville	5,940	5,137	5,301	5,874	4,939
Bolton	------	------	------	842	1,148
Brookhaven	4,211	3,724	3,511	3,019	2,541
Cranfield	2,398	1,776	1,497	1,299	1,206
Eucutta	1,542	1,352	1,355	1,484	1,318
Heidelburg	3,336	3,098	3,253	3,641	3,395
La Grange	2,701	2,269	2,128	2,137	1,936
Mallaliou	1,484	1,252	1,117	1,021	841
Soso	316	748	3,110	4,289	4,241
Tinsley	4,545	4,326	4,475	4,399	3,884
Yellow Creek	1,652	1,526	1,433	1,494	1,323
Other fields	7,495	9,032	10,561	11,325	12,430
Total Mississippi	35,620	34,240	37,741	40,824	39,202

[1] Preliminary figures.

TABLE 20.—Production of crude petroleum in Montana, 1953–57, by fields, in thousand barrels

[Montana Oil Conservation Board]

Field	1953	1954	1955	1956	1957[1]
Big Wall	191	258	300	255	248
Bowes	1,095	980	510	340	299
Cabin Creek	(2)	235	631	1,633	3,666
Cat Creek	209	200	174	162	163
Cut Bank	2,673	2,575	2,694	2,684	2,515
Elk Basin	1,704	1,643	1,441	2,007	2,603
Glendive	601	718	621	678	714
Kevin-Sunburst	1,296	1,207	1,131	1,017	953
Pine	(2)	430	1,115	3,667	5,326
Ponders	753	549	491	684	595
Poplar	1,155	3,016	3,185	4,098	4,894
Reagan	269	234	224	220	213
Sumatra	380	733	1,540	1,459	1,306
Other fields[3]	1,594	1,417	1,597	2,856	3,720
Total Montana	11,920	14,195	15,654	21,760	27,215

[1] Preliminary figures.
[2] Included in "Other fields."
[3] Includes crude oil consumed on leases and net change in stocks held on leases for entire State.

TABLE 21.—Production of crude petroleum in New Mexico, 1953–57, by districts and fields, in thousand barrels

[Oil and Gas Journal]

District and field	1953	1954	1955	1956	1957 [1]
Southeast:					
Bagley	2,033	1,867	1,659	1,614	1,471
Brunson	3,007	2,264	1,691	1,193	870
Caprock—East	1,886	2,135	2,243	6,942	6,362
Crossroad	939	1,355	1,193	1,358	1,307
Denton	8,668	10,651	11,031	10,778	9,391
Dollerhide—West	1,978	3,251	3,164	3,027	2,761
Drinkard	3,454	2,828	2,482	2,054	1,850
Eunice-Monument	9,321	9,029	10,544	10,527	12,817
Fowler	(2)	837	1,362	847	922
Gladiola	1,304	1,571	1,293	1,605	4,529
Grayburg-Jackson	1,162	1,114	1,054	945	845
Hare	2,047	1,642	1,290	973	829
Hobbs	3,663	3,340	3,397	3,401	3,495
Langlie-Mattix	1,669	1,402	1,641	2,046	1,989
Lovington—East	2,472	3,250	3,316	3,080	2,790
Maljamar	1,792	1,790	1,878	2,277	2,227
Moore	921	1,166	1,228	1,235	1,187
Saunders—South	2,164	2,200	1,903	1,727	1,534
Vacuum	4,281	3,832	3,804	3,944	3,724
Warren	1,438	1,469	1,508	1,473	1,007
Other fields [3]	15,466	17,112	24,260	25,433	30,333
Northwest [3]	776	715	1,017	1,414	2,519
Total New Mexico	70,441	74,820	82,958	87,893	94,759

[1] Preliminary figures. [2] Included in "Other fields." [3] Bureau of Mines figures.

TABLE 22.—Production of crude petroleum in Oklahoma, 1953–57, by fields, in thousand barrels

[Oil and Gas Journal]

Field	1953	1954	1955	1956	1957
Allen	1,456	1,709	1,733	1,638	1,608
Bebee	1,087	926	836	745	707
Burbank	3,476	3,466	10,139	13,519	14,280
Cache Creek	956	787	707	661	721
Camp	1,606	1,329	(1)	(1)	(1)
Cement	4,070	3,517	4,186	4,372	4,061
Cumberland	2,562	1,690	1,841	1,944	1,812
Cushing	3,385	3,176	2,823	2,549	2,650
Dilworth	(1)	1,279	1,135	921	677
Doyle	3,934	2,976	2,683	3,056	2,798
Elk City	6,380	5,348	6,277	5,326	4,078
Eola	1,651	1,424	2,193	3,566	3,886
Fox-Graham	5,920	4,559	(1)	(1)	(1)
Glenn	2,145	2,045	1,983	1,901	2,259
Healdton	2,288	2,171	2,307	2,347	2,260
Hewitt	2,703	3,339	3,411	3,495	3,240
Holdenville—East	(1)	1,149	1,476	1,117	628
Hoover—Northwest	601	1,189	1,662	2,063	1,863
Knox	1,595	1,165	1,143	1,291	1,232
Milroy	2,325	1,755	(1)	(1)	(1)
Oklahoma City	5,187	4,148	3,803	3,743	3,482
Olympic	4,064	4,083	2,662	1,752	1,573
Payson—East	1,725	1,076	918	786	467
Ringwood	855	727	551	484	------------
Seminole:					
Bowlegs	1,121	872	718	685	655
Little River	826	756	699	571	478
St. Louis	1,507	1,464	1,672	1,486	1,443
Seminole	1,211	998	921	827	912
Sholem-Alechem	12,736	10,261	(1)	(1)	(1)
Sho-Vel-Tum	------------	------------	30,316	29,717	29,008
South Burbank	894	1,429	(1)	(1)	(1)
Tatums	3,892	3,321	(1)	(1)	(1)
Velma—West	16,064	8,435	(1)	(1)	(1)
West Edmonds	1,887	1,821	1,733	1,945	1,662
Witcher	660	541	439	378	------------
Yale-Quay	2,171	1,915	1,479	1,322	1,765
Other fields [2]	99,630	99,005	110,371	121,655	124,906
Total Oklahoma	202,570	185,851	202,817	215,862	215,111

[1] Included in "Other fields." [2] Bureau of Mines figures.

TABLE 23.—Production of crude petroleum in Texas, 1953–57, by districts and fields

(Thousand barrels)

District and field [1]	1953	1954	1955	1956	1957 [2]
Gulf Coast:					
Amelia	1, 282	1, 161	1, 122	1, 091	(3)
Anahuac	6, 453	5, 240	5, 279	5, 165	5, 279
Barbers Hill	1, 862	1, 805	1, 959	1, 865	1, 662
Beaumont—West	1, 148	1, 035	954	900	(3)
Bloomington	1, 535	1, 341	1, 332	1, 276	1, 130
Boling	1, 959	1, 763	1, 698	1, 616	1, 433
Chocolate Bayou	4, 531	4, 952	4, 605	4, 118	4, 361
Conroe	11, 937	10, 081	10, 376	10, 455	9, 492
Damon Mound	605	1, 153	1, 098	907	(3)
Dickinson-Gillock	4, 235	4, 030	3, 987	3, 946	3, 571
Dyersdale	1, 183	975	841	688	(3)
Esperson	1, 365	1, 284	1, 154	1, 023	1, 005
Fairbanks	1, 585	1, 426	1, 427	1, 254	1, 054
Falls City	1, 059	898	904	854	(3)
Fannette	1, 760	1, 380	1, 252	1, 185	1, 511
Francitas	962	1, 172	1, 556	1, 540	1, 272
Friendwood	12, 398	10, 378	10, 620	10, 515	9, 511
Gohlke, Helen	2, 512	2, 478	2, 305	2, 081	1, 715
Goose Creek	2, 692	2, 715	3, 007	2, 813	2, 736
Greta	2, 871	2, 370	2, 398	2, 371	2, 221
Hankamer	1, 072	1, 110	1, 253	1, 118	1, 023
Hastings	13, 644	11, 570	11, 649	11, 396	10, 304
Heyser	1, 361	1, 064	1, 087	1, 001	(3)
High Island	2, 605	2, 819	3, 143	3, 476	3, 554
Houston—North-South	1, 286	1, 377	1, 341	1, 285	1, 227
Hull	2, 660	4, 411	4, 040	3, 909	3, 668
Humble	958	1, 067	1, 185	1, 057	1, 074
Liberty, South	2, 011	2, 348	2, 677	3, 324	4, 100
Livingston	1, 154	1, 086	1, 152	1, 059	(3)
Lolita	1, 476	1, 247	1, 358	1, 459	1, 378
Lovells Lake	978	863	860	870	(3)
McFaddin	1, 275	1, 076	1, 316	1, 314	1, 138
Manvel	2, 058	1, 735	1, 709	1, 649	1, 469
Markham	1, 691	1, 548	1, 422	1, 598	1, 819
Old Ocean	5, 954	4, 994	5, 378	5, 287	5, 674
Oyster Bayou	3, 219	3, 104	3, 080	2, 968	2, 612
Pierce Junction	1, 349	1, 036	1, 213	5, 395	6, 720
Placedo	2, 210	1, 951	1, 832	1, 716	1, 371
Port Neches	1, 846	1, 687	1, 491	1, 260	1, 002
Raccoon Bend	2, 225	2, 068	2, 082	2, 084	1, 694
Refugio-Fox	2, 419	2, 330	2, 422	2, 190	2, 055
Saratoga	675	1, 417	1, 968	1, 112	1, 618
Silsbee	1, 398	1, 248	1, 340	1, 284	937
Sour Lake	1, 576	1, 451	1, 459	1, 408	1, 319
Stowell	1, 936	1, 645	1, 709	1, 738	1, 198
Sugarland	1, 193	933	959	932	853
Sugar Valley	1, 364	1, 143	1, 135	1, 101	921
Thompson	10, 563	9, 099	8, 944	8, 990	8, 193
Tomball	2, 095	1, 888	2, 188	2, 242	2, 035
Village Mills	3, 494	2, 871	2, 519	2, 511	2, 730
West Columbia	2, 252	2, 344	2, 436	2, 365	2, 475
West Ranch	6, 652	5, 427	5, 606	6, 314	6, 190
Withers-Magnet	3, 933	3, 467	3, 273	3, 241	3, 162
Other Gulf Coast	73, 120	62, 098	78, 202	81, 254	80, 614
Total Gulf Coast	227, 636	203, 159	221, 302	225, 570	212, 080
East Texas:					
East Texas Proper	90, 743	81, 364	80, 279	77, 582	70, 783
Cuyuga	1, 258	1, 082	1, 078	1, 088	999
Ham Gossett	1, 186	1, 099	1, 067	871	659
Hawkins	18, 417	16, 589	16, 865	16, 304	14, 786
Long Lake	1, 236	959	988	1, 161	1, 779
New Hope	2, 191	2, 481	2, 510	2, 172	2, 162
Pewitt Ranch	1, 444	1, 209	1, 117	1, 073	927
Pickton	1, 788	1, 477	1, 453	1, 429	1, 189
Quitman	2, 941	2, 230	2, 190	2, 176	2, 192
Talco	5, 876	4, 928	4, 994	4, 896	4, 523
Van	10, 650	8, 850	8, 816	8, 703	7, 823
Waskom	1, 398	1, 049	1, 118	1, 191	872
Woodlawn	411	1, 045	919	652	419
Other East Texas	13, 359	14, 321	22, 256	21, 954	22, 722
Total East Texas	152, 898	138, 683	145, 650	141, 252	131, 835

See footnotes at end of table.

TABLE 23.—Production of crude petroleum in Texas, 1953–57, by districts and fields—Continued

(Thousand barrels)

District and field [1]	1953	1954	1955	1956	1957 [2]
Central Texas:					
Big Foot	1,792	2,413	2,455	2,148	1,610
Charlotte	1,536	1,760	2,152	2,960	2,071
Darst Creek	3,210	3,442	3,487	3,415	3,450
Luling	2,410	2,433	2,555	2,699	2,598
Other Central Texas	4,733	5,110	7,648	9,225	8,827
Total Central Texas	13,681	15,158	18,297	20,447	18,556
South Texas:					
Aqua Dulce	1,736	1,500	1,389	1,428	1,479
Flour Bluff	1,200	1,286	900	829	872
Fulton Beach	2,718	2,985	2,701	2,579	4,340
Garcia	1,223	1,057	1,008	931	834
Hoffman	1,841	1,500	1,500	1,385	1,440
Kelsey	2,243	3,173	3,609	3,833	3,359
London Gin	1,106	955	1,101	1,238	1,083
Midway	982	928	1,070	1,090	940
Mustang Island	2,878	2,697	2,768	2,566	2,246
Plymouth	6,915	6,613	6,740	6,043	4,757
Portilla	4,373	3,506	3,719	3,144	2,936
Saxet-Saxet Frio	998	830	757	1,173	1,312
Stratton	2,990	2,403	2,401	2,345	1,999
Sun	1,618	1,752	1,360	1,843	1,673
Taft	1,491	1,580	1,353	1,251	929
White Point	3,319	2,973	3,260	3,444	3,426
Willamer, West	2,920	2,434	2,480	2,442	2,072
Other South Texas	54,107	50,111	52,130	52,930	48,860
Total South Texas	94,658	88,283	90,246	90,494	84,557
North Texas	111,269	114,979	129,701	138,696	132,973
Panhandle	28,080	30,903	33,400	36,682	39,357
West Texas:					
Abell	1,439	1,227	1,497	1,520	1,590
Adair	2,915	2,390	2,487	2,392	2,107
Andector	6,691	5,580	5,692	5,510	4,500
Anton Irish-Anton	2,914	2,586	2,930	2,933	2,600
Benedum	3,444	2,853	2,645	2,225	1,982
Big Lake	1,018	1,014	921	801	(3)
Block 31	5,204	5,182	5,191	5,727	5,690
Bronte	(4)	906	1,107	932	1,865
Cedar Lake	1,702	1,544	1,614	1,464	1,385
Cogdell	8,171	6,558	6,507	6,848	6,908
Cowden	9,219	8,595	10,009	10,769	9,764
Cree-Sykes	2,303	1,429	1,230	1,079	1,241
Diamond M	10,592	8,920	9,300	9,381	8,465
Dollarhide	8,259	6,728	5,944	4,959	4,139
Elkhorn	1,579	1,739	1,216	900	(3)
Embar	1,080	1,002	1,259	1,704	1,862
Emma	(4)	(4)	2,118	3,259	3,452
Fort Chadborne	5,183	5,275	4,516	3,802	3,788
Fort Stockton	1,237	1,325	1,294	1,525	1,272
Foster	4,326	3,714	4,616	4,816	4,282
Fuhrman	1,497	1,671	2,655	3,662	4,471
Fullerton	7,862	6,513	6,973	6,495	5,977
Graza	3,125	2,899	2,628	2,815	2,625
Goldsmith	18,663	14,577	16,212	18,385	20,434
Good	1,637	1,290	1,448	1,383	1,248
Harper	(4)	(4)	1,477	2,217	2,424
Hendrick	1,225	1,409	1,307	1,263	1,351
Howard-Glasscock	6,657	7,488	7,364	6,905	6,683
Hulldale-Hulldale Penn	1,903	1,528	1,824	2,104	1,763
Jameson	4,425	5,445	7,694	6,905	4,822
Jordan	4,131	3,620	3,481	3,316	3,378
Kelly Snyder	25,549	17,035	22,308	25,339	26,827
Kermit	(4)	1,972	2,834	3,704	4,841
Keystone	10,990	13,210	8,848	7,801	7,005
Lea	(4)	(4)	1,363	1,506	1,359
Levelland	11,410	9,992	9,504	8,714	7,892
Luther	(4)	(4)	1,136	1,246	1,073
McCamey	2,825	2,497	2,003	1,730	1,881
McElroy	7,250	6,718	6,829	9,562	10,751
McFarland	(4)	(4)	(4)	2,050	3,708
Mabee	824	944	1,016	1,024	1,093

See footnotes at end of table.

TABLE 23.—Production of crude petroleum in Texas, 1953–57, by districts and fields—Continued

(Thousand barrels)

District and field [1]	1953	1954	1955	1956	1957 [2]
West Texas—Continued					
Magutex	(4)	974	1, 997	2, 232	2, 132
Martin	2, 643	2, 026	2, 052	2, 199	2, 067
Means	1, 523	1, 336	2, 996	6, 421	6, 495
Midland Farms	6, 843	4, 953	6, 997	7, 638	7, 143
Pegasus	5, 706	5, 778	5, 481	5, 165	4, 490
Penwell	978	1, 426	1, 612	1, 719	2, 049
Prentice	(4)	4, 187	5, 529	5, 753	5, 164
Reinecke	2, 748	1, 642	1, 572	1, 525	1, 401
Robertson	(4)	(4)	(4)	1, 344	1, 652
Russell	(4)	3, 474	5, 541	7, 200	6, 874
Salt Creek	3, 309	3, 371	4, 180	4, 039	3, 679
Sand Hills	4, 065	4, 000	5, 074	6, 800	6, 729
Seminole	6, 673	5, 459	5, 547	5, 584	5, 246
Shafer Lake	3, 044	3, 343	3, 799	3, 444	3, 019
Sharon Ridge	1, 174	1, 253	1, 348	1, 590	1, 966
Slaughter	13, 591	11, 370	11, 151	11, 010	10, 180
Spraberry Trend	17, 015	39, 968	22, 155	24, 010	19, 835
Three Bar	1, 577	2, 201	1, 214	1, 189	1, 036
Todd	2, 997	2, 492	2, 502	2, 435	1, 939
Triple N	(4)	1, 046	1, 254	1, 492	1, 342
TXL	10, 476	8, 277	6, 146	5, 602	5, 502
University	(4)	2, 615	2, 163	3, 704	4, 122
Vealmoor—East	5, 008	3, 603	3, 440	3, 248	2, 903
Waddell	1, 912	1, 151	1, 349	1, 572	2, 635
Ward-Estes	8, 921	7, 433	8, 713	9, 964	14, 245
Wasson	19, 160	15, 422	15, 752	15, 617	14, 377
Welch	1, 074	1, 032	1, 392	1, 835	1, 858
Wellman	2, 077	966	1, 163	1, 057	(3)
Westbrook	(4)	(4)	(4)	1, 209	1, 869
Wilshire	4, 620	3, 384	2, 953	2, 174	1, 949
World	1, 519	1, 376	1, 441	1, 903	1, 814
Yarbrough	2, 569	2, 023	2, 202	2, 141	1, 900
Yates	12, 271	9, 903	9, 878	9, 681	8, 818
Other West Texas	60, 200	58, 251	85, 111	101, 499	119, 526
Total West Texas	390, 942	383, 110	414, 701	454, 667	464, 454
Total Texas	1, 019, 164	974, 275	1, 053, 297	1, 107, 808	1, 083, 812

[1] Texas Railroad Commission districts.
[2] Preliminary figures.
[3] Included in "Other" fields.
[4] Not available.

TABLE 24.—Production of crude petroleum in Wyoming, 1953–57, by fields

(Thousand barrels)

Field	1953	1954	1955	1956	1957 [1]
Beaver Creek	605	726	1, 130	2, 436	2, 289
Big Muddy	1, 373	1, 088	1, 232	2, 120	1, 915
Big Sand Draw	2, 400	2, 503	2, 546	2, 543	2, 648
Bonanza	2, 935	3, 536	5, 033	5, 581	5, 075
Byron-Garland	5, 603	6, 642	7, 599	7, 916	6, 978
Cole Creek—Northeast and South	2, 271	1, 506	1, 223	1, 094	985
Elk Basin	8, 488	6, 889	7, 543	11, 200	12, 716
Frannie	3, 731	3, 708	3, 523	3, 055	2, 695
Gebo	888	698	1, 469	1, 342	1, 165
Glenrock—South	4, 197	3, 940	3, 660	3, 488	3, 091
Grass Creek	3, 583	4, 367	4, 155	4, 308	4, 000
Hamilton Dome	3, 558	3, 766	4, 681	5, 106	5, 617
Lance Creek	1, 662	1, 937	1, 484	1, 489	1, 539
Little Buffalo	1, 142	1, 224	1, 228	1, 187	1, 250
Lost Soldier-Wertz, etc	5, 900	6, 519	6, 449	6, 506	6, 513
Oregon Basin	3, 508	4, 698	5, 888	5, 817	5, 168
Salt Creek	4, 375	4, 583	4, 423	5, 085	6, 796
Steamboat Butte	3, 611	3, 443	3, 470	3, 419	3, 493
Sussex-Meadow	4, 022	6, 802	7, 392	7, 602	6, 728
Winkleman	1, 255	1, 414	1, 349	1, 777	2, 644
Other fields [2]	17, 511	23, 344	24, 006	21, 759	23, 311
Total Wyoming	82, 618	93, 333	99, 483	104, 830	106, 616

[1] Preliminary figures.
[2] Includes crude oil consumed on leases and net change in stocks held on leases for entire State.

WELLS

The number of wells drilled in the United States, including oil and gas wells and dry holes, totaled 52,777 in 1957—a decrease of 7.2 percent from the 57,111 wells drilled in 1956. The proportion of dry holes drilled to the total increased from 38.2 percent in 1956 to 39.2 percent in 1957.

Approximately 569,273 oil wells were producing as of December 31, 1957, and the daily average production per well was 12.8 barrels in 1957 compared with 13.3 in 1956.

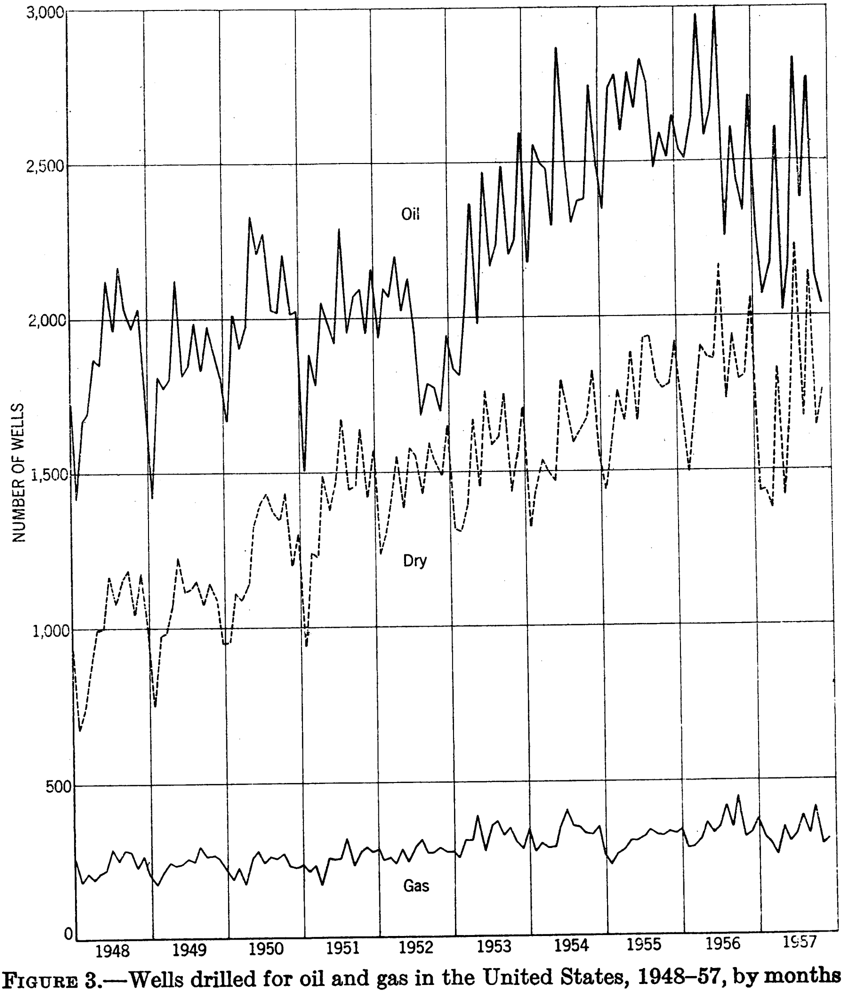

Figure 3.—Wells drilled for oil and gas in the United States, 1948–57, by months.

TABLE 25.—Wells drilled for oil and gas in the United States, 1956–57, by months

[Oil and Gas Journal]

Wells	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
													Number	Percent
1956														
Oil	2, 643	2, 533	2, 502	2, 646	2, 977	2, 574	2, 680	2, 995	2, 245	2, 611	2, 417	2, 335	31, 158	54. 6
Gas	345	281	287	309	362	327	352	420	340	446	316	330	4, 115	7. 2
Dry	1, 912	1, 719	1, 485	1, 686	1, 900	1, 862	1, 858	2, 162	1, 723	1, 940	1, 790	1, 801	21, 838	38. 2
Total	4, 900	4, 533	4, 274	4, 641	5, 239	4, 763	4, 890	5, 577	4, 308	4, 997	4, 523	4, 466	57, 111	100. 0
1957														
Oil	2, 710	2, 274	2, 061	2, 169	2, 614	2, 016	2, 196	2, 835	2, 366	2, 771	2, 117	2, 035	28, 164	53. 4
Gas	373	315	297	258	345	297	322	381	321	413	287	303	3, 912	7. 4
Dry	2, 063	1, 425	1, 438	1, 376	1, 840	1, 407	1, 724	2, 226	1, 665	2, 147	1, 630	1, 760	20, 701	39.2
Total	5, 146	4, 014	3, 796	3, 803	4, 799	3, 720	4, 242	5, 442	4, 352	5, 331	4, 034	4, 098	52, 777	100. 0

TABLE 26.—Wells drilled for oil and gas in the United States, 1956–57, by States and districts

[Oil and Gas Journal]

State and district	1956				1957			
	Oil	Gas	Dry	Total	Oil	Gas	Dry	Total
Alabama	56	1	34	91	50	1	27	78
Arkansas	657	13	332	1, 002	709	21	383	1, 113
California	1, 680	51	573	2, 304	1, 555	53	617	2, 225
Colorado	251	107	864	1, 222	144	91	620	855
Illinois	1, 674	63	2, 066	3, 803	1, 065	19	1, 602	2, 686
Indiana	288	7	439	734	263	14	475	752
Kansas	2, 240	381	2, 242	4, 863	1, 913	333	1, 909	4, 155
Kentucky	795	165	971	1, 931	511	164	820	1, 495
Louisiana:								
Gulf Coast	1, 097	240	833	2, 170	1, 220	264	924	2. 408
Northern	985	161	556	1, 702	802	116	529	1, 447
Total Louisiana	2, 082	401	1, 389	3, 872	2, 022	380	1, 453	3, 855
Michigan	202	12	223	437	180	47	228	455
Mississippi	145	5	291	441	132	3	251	386
Montana	234	7	253	494	189	15	229	433
Nebraska	301	1	616	918	291	2	593	886
New Mexico	861	674	369	1, 904	1, 113	606	408	2, 127
Oklahoma	4, 825	321	2, 476	7, 622	3. 536	234	2, 148	5, 918
Pennsylvania, New York, Ohio, West Virginia	1, 127	934	523	2, 584	1, 191	964	467	2, 622
Texas:								
Gulf Coast	1, 219	285	1, 118	2, 622	1, 107	237	1, 070	2, 414
West Texas	4, 725	43	939	5, 707	4, 751	58	1, 217	6, 026
East Texas	485	82	564	1, 131	765	46	544	1, 355
Other districts	6, 653	484	4, 863	12, 000	6, 006	540	4, 832	11, 378
Total Texas	13, 082	894	7, 484	21, 460	12, 629	881	7, 663	21, 173
Wyoming	448	52	430	930	361	46	436	843
Other States	210	26	263	499	310	38	372	720
Total United States	31, 158	4, 115	21, 838	57, 111	28, 164	3, 912	20, 701	52, 777

CONSUMPTION AND DISTRIBUTION

The total demand for crude oil in the United States in 1957 exceeded by 0.5 percent the peak demand of 1956. The demand for domestic crude oil declined 0.4 percent, whereas the demand for foreign crude increased 7.8 percent.

Foreign crude oil supplied 12.4 percent of the total demand in 1957 compared with 11.6 in 1956.

Large shipments of crude oil to Europe, which began in November 1956 and continued until May 1957, resulted in an increase of 74 percent in crude-oil exports for 1957.

TABLE 27.—Producing oil wells in the United States and average production per day, 1956 and 1957, by States and districts

	Producing oil wells			
	1956		1957[1]	
	Approximate number of producing oil wells Dec. 31	Average production per well per day (barrels)[2]	Approximate number of producing oil wells Dec. 31	Average production per well per day (barrels)[2]
Arkansas	5,225	16.3	5,680	15.4
California	35,990	27.1	37,020	25.5
Colorado	2,150	78.2	2,185	69.3
Illinois	31,400	7.4	31,585	6.8
Indiana	4,405	7.4	4,515	7.9
Kansas	37,570	9.2	38,330	8.8
Kentucky	18,660	2.6	18,260	2.5
Louisiana:				
Gulf Coast	9,175	77.6	9,980	79.3
Northern	11,730	12.0	11,965	10.7
Total Louisiana	20,905	41.2	21,945	41.3
Michigan	4,191	7.1	3,995	6.8
Mississippi	2,374	47.3	2,313	45.8
Montana	3,584	17.0	3,792	20.2
Nebraska	825	54.8	1,030	57.8
New Mexico:				
Southeastern	(3)	(3)	10,351	(3)
Northwestern	(3)	(3)	469	(3)
Total New Mexico	9,415	26.6	10,820	25.7
New York	19,670	.4	19,695	.4
North Dakota	789	54.2	920	43.7
Ohio	14,385	.9	14,490	1.0
Oklahoma	70,075	8.4	74,425	8.2
Pennsylvania	71,080	.3	69,610	.3
Texas:[4]				
Gulf Coast	20,770	30.2	23,500	26.2
East Texas proper	20,925	10.2	20,665	9.3
West Texas	56,350	23.9	59,850	21.9
Other districts	80,050	12.6	83,920	11.2
Total Texas	178,095	17.9	187,935	16.2
West Virginia	12,770	.5	12,715	.5
Wyoming	7,190	40.5	7,405	40.0
Other States	422	42.9	[5] 608	53.7
Total United States	551,170	13.3	569,273	12.8

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[1] Preliminary figures.
[2] Based on the average number of wells during the year.
[3] Not available.
[4] Texas Railroad Commission divisions.
[5] Alabama, 221; Florida, 11; Missouri, 107; Nevada, 2; South Dakota, 3; Tennessee, 35; Utah, 225; Virginia, 4.

TABLE 28.—Runs to stills of crude petroleum in the United States in 1957, by district and month [1]

(Thousand barrels)

District [2]	January	February	March	April	May	June	July	August	September	October	November	December	Total
East Coast:													
Domestic	20,654	17,468	21,416	19,597	17,677	13,709	14,292	13,326	13,042	13,979	14,102	17,155	196,417
Foreign	16,972	15,464	16,674	16,008	20,058	22,599	24,004	26,446	22,070	19,749	19,229	20,070	239,343
Total East Coast	37,626	32,932	38,090	35,605	37,735	36,308	38,296	39,772	35,112	33,728	33,331	37,225	435,760
Appalachian	6,616	5,901	6,596	6,074	5,777	4,780	4,655	5,163	6,272	6,751	6,288	6,600	71,473
Indiana, Illinois, Kentucky, etc.:													
Domestic	45,221	40,933	43,271	38,256	43,660	39,869	38,985	40,945	41,965	42,255	43,066	44,487	502,913
Foreign	135	113	131	259	516	337	415	327	280	114	163	127	2,917
Total Indiana, Illinois, Kentucky, etc	45,356	41,046	43,402	38,515	44,176	40,206	39,400	41,272	42,245	42,369	43,229	44,614	505,830
Minnesota, Wisconsin, North Dakota, and South Dakota:													
Domestic	1,366	1,176	1,348	1,267	1,559	1,453	1,560	1,555	920	1,245	1,124	1,339	15,912
Foreign	1,733	1,698	1,841	1,339	1,595	1,530	1,674	1,690	909	1,304	1,577	1,921	18,811
Total Minnesota, Wisconsin, North Dakota, and South Dakota	3,099	2,874	3,189	2,606	3,154	2,983	3,234	3,245	1,829	2,549	2,701	3,260	34,723
Oklahoma, Kansas, etc	22,134	19,308	21,175	18,875	21,709	21,586	22,564	23,060	21,104	21,973	20,787	22,657	256,932
Texas Inland	8,639	7,565	8,365	7,519	8,335	8,241	8,601	8,872	8,505	7,947	7,797	8,257	98,643
Texas Gulf Coast:													
Domestic	62,757	53,884	60,404	58,458	57,627	55,707	57,010	58,660	55,931	54,369	51,209	55,123	681,139
Foreign	280	580	123	181	561	357	456	770	806	1,172	899	884	7,069
Total Texas Gulf Coast	63,037	54,464	60,527	58,639	58,188	56,064	57,466	59,430	56,737	55,541	52,108	56,007	688,208
Louisiana Gulf Coast:													
Domestic	21,765	19,121	20,589	19,858	20,122	19,436	20,461	19,951	18,060	18,957	18,340	18,533	235,193
Foreign	75	50	65	72	106	140	240	382	311	83	110	22	1,656
Total Louisiana Gulf Coast	21,840	19,171	20,654	19,930	20,228	19,576	20,701	20,333	18,371	19,040	18,450	18,555	236,849
Arkansas, Louisiana Inland, etc	3,143	2,695	2,874	1,965	2,569	2,777	3,000	2,826	2,958	2,621	2,874	2,955	33,257
New Mexico	876	772	811	845	732	797	811	860	754	856	822	745	9,681

Rocky Mountain:													
Domestic	8,847	8,003	8,277	7,151	7,834	8,747	8,834	9,046	8,683	8,094	8,248	7,947	99,711
Foreign	7	11	10	6	5	14	11	6	5	2	6	3	86
Total Rocky Mountain	8,854	8,014	8,287	7,157	7,839	8,761	8,845	9,052	8,688	8,096	8,254	7,950	99,797
West Coast:													
Domestic	29,160	25,951	30,242	26,447	29,114	25,622	26,515	27,825	27,187	28,025	24,841	27,472	328,401
Foreign	6,105	5,768	5,233	8,020	8,204	8,301	9,324	9,137	7,844	7,647	9,291	6,008	90,882
Total West Coast	35,265	31,719	35,475	34,467	37,318	33,923	35,839	36,962	35,031	35,672	34,132	33,480	419,283
Total United States:													
Domestic	231,178	202,777	225,368	206,312	216,715	202,724	207,288	212,089	205,381	207,072	199,498	213,270	2,529,672
Foreign	25,307	23,684	24,077	25,885	31,045	33,278	36,124	38,758	32,225	30,071	31,275	29,035	360,764
Grand total, 1957	256,485	226,461	249,445	232,197	247,760	236,002	243,412	250,847	237,606	237,143	230,773	242,305	2,890,436
1956	248,721	233,374	245,340	224,623	244,784	242,119	248,439	247,851	240,708	235,842	240,944	252,361	2,905,106
Daily average, 1957	8,274	8,088	8,219	7,740	7,992	7,867	7,852	8,092	7,920	7,650	7,692	7,816	----------

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[1] Preliminary figures.

[2] Where no breakdown is shown, all runs were of domestic crude.

Runs to Stills.—Total crude runs to stills, which averaged 7,919,000 barrels daily in 1957, were 18,000 barrels daily below the 1956 average. Runs averaged 8,137,000 barrels daily in the first quarter of 1957, dropped to 7,868,000 barrels daily in the second quarter, and declined to 7,837,000 barrels daily in the last half of the year.

Distribution.—The Bureau of Mines collects data on receipts of domestic and foreign crude petroleum at refineries in the United States. These receipts include crude runs to stills, a small quantity used as refinery fuel, and any increase in crude stocks at refineries. Classification of receipts, by State of origin, shows receipts from local production (intrastate), receipts from other States (interstate), and receipts of imported crude. Classification by method of transportation indicates the final receipts by water, pipeline, and tank car and truck. Receipts of domestic crude by water usually were moved by pipeline from the point of production to the point of water shipment.

Refineries received 2,899.0 million barrels of crude petroleum in 1957 from domestic and foreign sources and processed 2,890.0 million barrels. Stocks of crude oil at refineries increased 4.9 million barrels during the year, and 4.1 million barrels was accounted for as fuel or losses.

Refiners processed 98 percent of the crude oil imported, the balance being used directly as heavy fuel oil.

Foreign crude oil represented 50.7 percent of the total receipts at refineries in the East Coast district, 22.2 percent in the West Coast district, 2.7 percent in the Great Lakes area, and 0.8 percent in the Gulf Coast area.

Receipts of crude oil at the refineries in 1957 indicated 73.6 percent was received by pipeline, 25.0 percent by tanker and barge, and 1.4 percent by tank car and truck.

The major waterborne shipments were from the Gulf coast to the east coast and between States in the Gulf Coast districts. There are also some interstate and intrastate shipments by water on the west coast and the Mississippi River.

Demand by States of Origin.—Distribution of domestic crude oil by refining States and districts can be analyzed from receipts of crude oil at refineries. When long-distance shipments are involved, various crudes may be mixed in transit or storage, and identification by origin may be only approximate.

TABLE 29.—Receipts of domestic and foreign crude petroleum at refineries in the United States, 1953–57

(Million barrels)

Method of transportation	1953	1954	1955	1956	1957[1]
By water:					
Intrastate	173.1	161.0	155.4	166.4	152.2
Interstate	231.1	205.6	202.9	220.6	253.7
Foreign	233.9	236.9	268.6	304.5	318.0
Total by water	638.1	603.5	626.9	691.5	723.9
By pipeline:					
Intrastate	1,158.1	1,172.6	1,278.1	1,329.1	1,296.7
Interstate	727.7	721.2	772.0	819.3	790.6
Foreign	2.5	2.6	16.8	37.3	47.8
Total by pipeline	1,888.3	1,896.4	2,066.9	2,185.7	2,135.1
By tank cars and truck:					
Intrastate	26.1	26.2	28.9	28.9	31.9
Interstate	11.5	10.5	9.2	6.0	8.0
Foreign	----------	----------	----------	----------	.1
Total by tank cars and trucks	37.6	36.7	38.1	34.9	40.0
Grand total	2,564.0	2,536.6	2,731.9	2,912.1	2,899.0

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[1] Preliminary figures.

TABLE 30.—Refinery receipts of domestic crude oil by States and districts, 1957

(Thousand barrels)

Receiving States and districts	Total domestic receipts	Intrastate receipts	Interstate receipts from—																		
			Ala. and Miss.	Ark.	Calif. and Nev.	Colo.	Fla. and N. Y.	Ill.	Ind.	Kans.	Ky. and Ohio	La.	Mont.	Nebr., N. Dak., and S. Dak.	N. Mex.	Okla.	Texas	Utah	W. Va.	Wyo.	Total
Delaware, Massachusetts, Rhode Island	24,621		1,696									6,443					16,482				24,621
Florida, Georgia, South Carolina, Virginia	1,615		1,145														470				1,615
Maryland	8,956		45									4,160					4,751				8,956
New Jersey	58,466		6,461				449					16,233					35,323				58,466
New York:																					
East	445		445																		445
West	21,758	1,515						2,938		1,261			3,045			3,795	9,204				20,243
Pennsylvania:																					
East	102,029		3,981									23,695				395	73,958				102,029
West	13,041	9,327									1,171						2,181		362		3,714
West Virginia	2,419	1,704									715										715
District 1	233,350	12,546	13,773				449	2,938		1,261	1,886	50,531	3,045			4,190	142,369		362		220,804
Illinois	176,610	23,399				461				13,066		305	121	5,008	7,792	24,682	88,505			13,271	153,211
Indiana	147,462	950				2,827		6,043		26,755			5,713	424	4,922	29,784	34,718			35,326	146,512
Kansas	103,931	75,824				6,642							101	1,902	3,002	9,562	6,832			66	28,107
Kentucky, Tennessee	33,843	18,199	2,736	1,060					10,114		126	894					714				15,644
Michigan	48,726	11,227				663		5,845	518	43			2,067	825		2,123	11,591			13,824	37,499
Minnesota, Wisconsin	3,246												122	489						2,635	3,246
Missouri	25,147									724					5,529	1,698	13,468			3,728	25,147
Nebraska	851	31																		820	820
North and South Dakota	12,799	12,799																			
Ohio:																					
East	34,307	3,090	543	377		474		24,165		1,375	1,270					1,638	1,375				31,217
West	95,579	48		447		2,999		10,075			396	3,498		5,054	4,160	18,383	49,693			826	95,531
Oklahoma	126,582	98,671								12,557					215		15,139				27,911
District 2	809,083	244,238	3,279	1,884		14,066		46,128	10,632	54,520	1,792	4,697	8,124	13,702	25,620	87,870	222,035			70,496	564,845

Alabama, Mississippi	6,863	4,502	2,235									126									2,361
Arkansas	25,225	22,759										1,347					1,119				2,466
Louisiana	236,793	162,471	21,409	13,277													39,636				74,322
New Mexico	9,584	8,038															1,516	30			1,546
Texas	780,233	650,166	725							405		71,253			56,455	1,229					130,067
District 3	1,058,698	847,936	24,369	13,277						405		72,726			56,455	1,229	42,271	30			210,762
Colorado	10,652	2,196											2,198							6,258	8,456
Montana	22,796	8,274																		14,522	14,522
Utah	31,664	3,823				26,671									2					1,168	27,841
Wyoming	34,689	32,437				2,244								8							2,252
District 4	99,801	46,730				28,915							2,198	8	2					21,948	53,071
California	329,922	329,381													411			130			541
Oregon, Washington	2,258	2			2,256																2,256
District 5	332,180	329,383			2,256										411			130			2,797
1957 U. S. total	2,533,112	1,480,833	41,421	15,161	2,256	42,981	449	49,066	10,632	56,186	3,678	127,954	13,367	13,710	82,488	93,289	406,675	160	362	92,444	1,052,279
1957 daily average	6,940	4,057	113	42	6	118	1	134	29	154	10	351	37	38	226	256	1,114		1	253	2,883
1956 daily average	7,023	4,165	103	39	5	126	1	154	13	161	13	304	24	33	201	263	1,188		1	229	2,858

TABLE 31.—Crude runs to stills and refinery receipts of crude oil by method of transportation and by States and districts, 1957

(Thousand barrels)

Receiving State and district	Crude runs to stills	Fuel and losses	Origin of domestic crude receipts	Change in refinery stocks	Total receipts by method of transportation						
					Intrastate			Interstate			Foreign boats
					Pipelines	Tank cars and trucks	Boats	Pipelines	Tank cars and trucks	Boats	
Delaware, Massachusetts, Rhode Island	55, 279	51		+357						24, 621	31, 066
Florida, Georgia, South Carolina, Virginia	14, 267	41	449	−436					339	1, 276	12, 257
Maryland	16, 945	−9		−193						8, 956	7, 787
New Jersey	130, 359	102		+524						58, 466	72, 519
New York:											
East	13, 754	40		−368						445	12, 981
West	21, 819	−3	1, 515	−58	1, 515			20, 143		100	
Pennsylvania:											
East	205, 156	312		−15						102, 029	103, 424
West	12, 965	−6	9, 327	+82	9, 280	47		2, 308	221	1, 185	
West Virginia	2, 417	−1	2, 066	+3	1, 702	2		682	33		
District 1	472, 961	527	13, 357	−104	12, 497	49		23, 133	593	197, 078	240, 034
Illinois	177, 246	−13	72, 465	−623	23, 392	7		152, 906	305		
Indiana	147, 830	38	11, 582	−406	672	278		146, 408	104		
Kansas	104, 201	9	132, 010	−279	74, 818	987	19	28, 065	42		
Kentucky, Tennessee	33, 855	−1	19, 948	−11	3, 735	103	14, 361	3, 521	83	12, 040	
Michigan	49, 414	1, 030	11, 227	−183	10, 486	741		35, 023		2, 476	[1] 1, 535
Minnesota, Wisconsin	21, 979	16		+219					1, 508	1, 738	[2] 18, 968
Missouri	25, 150			−3				25, 147			
Nebraska	859	−1	13, 252	−7	31			759	61		
North and South Dakota	12, 744	−1	13, 288	+56	12, 403	396					
Ohio:											
East	34, 272	−2	5, 067	+37	2, 894	196		31, 217			
West	97, 485	−8		−105	26	22		95, 531			1, 793
Oklahoma	126, 722	38	191, 960	−178	96, 790	1, 881		27, 911			
District 2	831, 757	1, 105	470, 799	−1, 483	225, 247	4, 611	14, 380	546, 488	2, 103	16, 254	22, 296

Alabama, Mississippi	7,915	−5	45,923	−45	3,213	257	1,032		1,097	1,264	1,002
Arkansas	25,229	−27	37,920	+23	22,114	645		2,356	110		
Louisiana	236,962	340	290,425	+168	87,119	1,498	73,854	69,553	568	4,201	677
New Mexico	9,681	−3	90,526	−94	7,324	714		1,516	30		
Texas	786,851	57	1,056,841	+375	616,439	6,870	26,857	96,947		33,120	7,050
District 3	1,066,638	362	1,521,635	+427	736,209	9,984	101,743	170,372	1,805	38,585	8,729
Colorado	10,708	−6	45,177	−50	1,553	643		8,456			
Montana	22,862	10	21,641	+10	7,485	784	5	14,467	55		[3] 86
Utah	31,610	−10	3,983	+64	2,342	1,481		27,694	147		
Wyoming	34,617	86	124,881	−14	30,560	1,877			2,252		
District 4	99,797	80	195,682	+10	41,940	4,785	5	50,617	2,454		86
California	389,283	1,611	331,637	+5,605	280,852	12,466	36,063		541		66,577
Oregon, Washington	30,000	30	2	+400		2			454	1,802	[4] 28,172
District 5	419,283	1,641	331,639	+6,005	280,852	12,468	36,063		995	1,802	94,749
Total 1957	2,890,436	3,715	2,533,112	+4,855	1,296,745	31,897	152,191	790,610	7,950	253,719	[5] 365,894
Daily average	7,919	10	6,940	+13	3,553	87	417	2,166	22	695	1,002
Daily average, 1956	7,937	6	7,023	+13	3,631	79	455	2,239	16	603	934

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[1] Pipeline.

[2] Includes pipeline, 18,955; tank cars and trucks, 13.

[3] Tank cars and trucks.

[4] Includes pipeline, 27,341.

[5] Excludes crude oil imported for direct fuel use.

TABLE 32.—Daily average total demand for crude petroleum in the United States in 1956–57, by States of origin and months

(Thousand barrels)

State	January	February	March	April	May	June	July	August	September	October	November	December	Year
1956													
Alabama	4.3	2.9	3.1	2.4	2.5	8.6	6.2	13.5	12.1	8.8	17.1	6.2	7.3
Arkansas	77.3	75.3	61.3	64.8	90.2	83.4	87.8	78.5	76.5	68.5	87.3	79.2	77.5
California	987.1	971.8	960.8	938.2	978.2	946.7	990.6	909.7	981.3	895.3	971.8	962.9	957.8
Colorado	156.3	168.9	147.0	157.6	171.9	153.5	166.7	153.5	178.6	162.4	153.3	158.6	160.7
Florida	----------	.1	----------	----------	3.2	----------	3.7	.4	.6	3.4	1.2	2.2	1.3
Illinois	215.8	247.0	203.4	223.2	216.6	215.2	219.1	224.8	213.1	213.3	235.0	246.1	222.6
Indiana	27.2	27.1	27.1	28.1	30.0	31.5	30.0	29.2	37.5	29.9	38.9	41.4	31.5
Kansas	344.5	356.0	335.8	308.6	315.8	317.4	350.0	358.2	342.5	306.0	334.9	342.8	334.4
Kentucky	55.0	47.0	44.1	47.5	48.7	41.7	53.5	31.5	48.9	49.1	54.6	50.8	47.7
Louisiana	800.4	816.7	820.8	793.9	843.7	813.9	749.6	774.3	782.7	789.8	839.1	918.7	812.0
Michigan	33.4	29.1	28.4	28.1	28.0	26.4	31.4	28.3	31.2	28.5	27.6	24.9	28.8
Mississippi	110.3	118.8	106.8	111.8	120.2	108.2	101.5	114.3	117.4	116.9	89.6	123.0	111.6
Missouri, Nevada, South Dakota, Tennessee, Virginia	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.5
Montana	54.0	54.9	47.6	37.8	60.9	55.0	68.9	55.6	43.1	60.2	63.4	69.7	56.0
Nebraska	39.1	33.7	53.2	21.0	45.2	37.5	46.3	40.8	65.4	58.2	47.0	52.7	45.1
New Mexico	247.1	226.3	258.5	233.2	238.0	205.2	241.1	239.7	244.9	198.1	310.8	266.1	242.4
New York	7.5	7.5	7.5	6.0	7.6	7.8	7.9	7.8	7.0	7.7	7.4	7.4	7.4
North Dakota	40.1	39.7	38.7	25.7	27.7	40.4	39.4	37.2	39.9	24.2	43.8	41.4	36.5
Ohio	13.4	12.6	12.2	10.7	11.9	15.4	12.4	11.8	15.2	13.5	14.8	15.1	13.2
Oklahoma	581.8	574.7	594.8	550.7	564.9	585.9	556.7	597.4	606.6	565.6	594.0	658.0	586.0
Pennsylvania	27.5	20.1	24.1	21.2	25.2	24.8	26.1	23.2	23.5	23.5	26.7	22.1	24.0
Texas	3,140.4	3,107.1	3,058.5	2,920.7	3,002.1	3,186.0	2,977.5	3,018.3	2,957.3	2,803.0	3,143.1	3,279.0	3,049.1
Utah	6.6	6.6	5.2	4.8	5.3	4.8	5.9	8.8	7.6	8.2	7.9	8.5	6.7
West Virginia	6.1	6.1	6.5	5.6	7.2	6.3	7.1	6.6	5.2	7.1	5.3	4.0	6.1
Wyoming	303.6	325.0	269.2	222.0	234.5	297.0	282.6	312.2	275.2	275.4	304.2	305.6	283.8
Total domestic crude	7,279.3	7,275.5	7,115.1	6,764.1	7,080.0	7,213.1	7,062.5	7,076.1	7,113.8	6,717.1	7,419.2	7,686.8	7,150.0
Foreign crude	852.6	853.8	898.0	817.1	908.4	974.2	1,029.3	1,024.8	1,020.2	990.0	951.7	884.8	934.1
Grand total, 1956	8,131.9	8,129.3	8,013.1	7,581.2	7,988.4	8,187.3	8,091.8	8,100.9	8,134.0	7,707.1	8,370.9	8,571.6	8,084.1
Pennsylvania Grade (included above)	45.3	37.7	41.9	35.7	42.5	43.7	44.8	40.2	40.3	42.5	43.5	37.5	41.3

1957 [1]													
Alabama	11.2	15.8	14.0	12.0	15.9	12.9	11.1	15.8	15.8	23.2	12.9	18.8	15.0
Arkansas	88.2	103.6	88.8	79.2	84.1	85.6	83.4	63.1	94.6	78.2	87.8	77.1	84.3
California	954.9	928.3	986.9	891.2	928.2	872.0	871.6	915.3	922.6	912.3	851.7	891.7	910.7
Colorado	170.7	165.1	152.0	159.4	141.6	143.1	160.6	126.6	152.4	134.4	166.4	136.7	150.6
Florida	.9	1.9	.3	.5	---------	.8	3.2	1.7	1.7	1.0	2.8	---------	1.2
Illinois	260.6	230.9	226.4	215.4	217.4	160.6	157.7	183.4	227.6	225.6	238.2	238.5	215.1
Indiana	34.9	37.0	37.0	36.6	39.2	30.1	31.2	33.5	36.6	35.9	35.5	35.1	35.2
Kansas	365.5	338.1	311.4	267.7	336.4	353.3	331.9	342.8	351.0	368.5	304.1	339.2	334.3
Kentucky	54.8	47.4	47.4	47.8	44.2	46.4	39.0	44.5	38.6	47.7	44.5	49.3	46.0
Louisiana	998.5	995.1	1,057.1	951.9	921.6	855.2	853.7	804.2	769.1	754.5	774.7	877.0	884.0
Michigan	27.9	28.9	30.7	26.7	25.6	29.3	29.8	32.4	29.4	30.1	25.3	25.0	28.4
Mississippi	105.1	147.6	115.7	87.5	135.0	85.6	112.1	103.5	92.5	130.5	97.0	92.6	108.6
Missouri, Nevada, South Dakota, Tennessee, Virginia	.4	.4	.3	.4	.3	.3	.4	.3	.4	.5	.6	.5	.4
Montana	61.5	95.9	66.5	71.1	78.3	87.6	60.7	71.5	80.4	68.8	84.0	82.6	75.5
Nebraska	48.1	47.7	47.6	60.7	32.4	49.3	62.4	47.7	51.4	71.0	48.7	79.1	53.9
New Mexico	252.2	286.8	277.5	240.1	249.0	260.1	210.4	266.7	264.7	243.1	277.7	252.8	256.5
New York	6.9	7.4	7.4	7.9	7.6	6.3	7.5	7.9	7.6	7.6	7.3	7.3	7.4
North Dakota	42.1	40.4	41.7	35.5	40.4	39.8	38.8	40.6	18.9	33.9	29.3	43.9	37.2
Ohio	14.6	14.9	9.8	12.2	12.8	13.7	12.9	13.6	18.5	17.5	15.4	19.6	14.6
Oklahoma	661.2	637.6	648.5	631.8	595.1	557.1	539.1	611.7	564.2	576.5	600.7	595.1	601.4
Pennsylvania	23.1	19.5	23.2	19.0	23.4	22.2	18.4	18.3	26.0	20.4	18.9	23.3	21.3
Texas	3,288.6	3,088.5	3,326.1	3,076.2	2,940.8	2,847.0	2,801.3	2,858.4	2,881.5	2,679.9	2,748.4	2,790.1	2,943.3
Utah	11.4	9.8	11.8	10.5	7.0	9.1	9.4	10.5	11.6	13.2	12.8	13.9	10.9
West Virginia	6.3	4.6	6.3	6.4	5.3	4.8	6.2	4.8	7.0	5.4	6.9	6.6	5.9
Wyoming	292.6	318.7	285.8	273.0	271.3	293.4	307.5	329.6	297.0	300.5	282.8	313.4	297.1
Total domestic crude	7,782.2	7,611.9	7,820.2	7,220.7	7,152.9	6,865.6	6,760.3	6,948.4	6,961.1	6,780.2	6,774.4	7,009.2	7,138.8
Foreign crude	827.6	853.3	791.5	881.3	1,022.9	1,130.9	1,193.8	1,282.9	1,094.5	986.7	1,074.2	967.4	1,009.8
Grand total, 1957	8,609.8	8,465.2	8,611.7	8,102.0	8,175.8	7,996.5	7,954.1	8,231.3	8,055.6	7,766.9	7,848.6	7,976.6	8,148.6
Pennsylvania Grade (included above)	40.9	35.9	39.0	37.0	40.3	37.1	36.4	33.0	45.9	38.8	36.2	42.3	38.6

[1] Preliminary figures.

TABLE 33.—Demand for total crude petroleum in the United States, 1956–57, by States of origin and months

(Thousand barrels)

State	January	February	March	April	May	June	July	August	September	October	November	December	Total
1956													
Alabama	132	85	95	71	77	259	193	417	363	275	513	191	2, 671
Arkansas	2, 396	2, 183	1, 900	1, 944	2, 797	2, 502	2, 723	2, 435	2, 296	2, 124	2, 620	2, 454	28, 374
California	30, 601	28, 182	29, 786	28, 145	30, 325	28, 400	30, 709	28, 201	29, 440	27, 754	29, 155	29, 849	350, 547
Colorado	4, 845	4, 899	4, 557	4, 729	5, 330	4, 604	5, 167	4, 759	5, 358	5, 034	4, 599	4, 918	58, 799
Florida	---------	3	---------	2	100	---------	115	12	17	105	35	69	458
Illinois	6, 689	7, 164	6, 306	6, 697	6, 716	6, 457	6, 789	6, 968	6, 393	6, 612	7, 050	7, 629	81, 470
Indiana	843	785	839	842	932	946	931	906	1, 125	928	1, 166	1, 284	11, 527
Kansas	10, 681	10, 325	10, 410	9, 257	9, 791	9, 521	10, 851	11, 105	10, 276	9, 487	10, 048	10, 627	122, 379
Kentucky	1, 705	1, 363	1, 367	1, 424	1, 509	1, 252	1, 659	978	1, 466	1, 522	1, 638	1, 576	17, 459
Louisiana	24, 812	23, 684	25, 446	23, 818	26, 155	24, 416	23, 238	24, 003	23, 480	24, 484	25, 174	28, 480	297, 190
Michigan	1, 035	843	881	842	868	793	973	877	936	884	828	771	10, 531
Mississippi	3, 420	3, 444	3, 311	3, 355	3, 726	3, 246	3, 147	3, 542	3, 522	3, 625	2, 687	3, 814	40, 839
Missouri, Nevada, South Dakota, Tennessee, Virginia	14	15	15	14	17	15	15	15	14	14	13	13	174
Montana	1, 675	1, 591	1, 477	1, 133	1, 887	1, 650	2, 137	1, 725	1, 292	1, 866	1, 901	2, 160	20, 494
Nebraska	1, 213	977	1, 650	631	1, 400	1, 124	1, 436	1, 265	1, 961	1, 803	1, 411	1, 634	16, 505
New Mexico	7, 659	6, 562	8, 015	6, 996	7, 378	6, 157	7, 470	7, 430	7, 348	6, 141	9, 324	8, 250	88, 730
New York	234	218	229	180	235	235	245	242	210	239	222	230	2, 719
North Dakota	1, 243	1, 152	1, 201	771	858	1, 211	1, 220	1, 154	1, 198	751	1, 315	1, 284	13, 358
Ohio	414	364	377	322	369	461	384	365	457	420	444	468	4, 845
Oklahoma	18, 035	16, 667	18, 438	16, 521	17, 513	17, 578	17, 259	18, 518	18, 198	17, 533	17, 819	20, 397	214, 476
Pennsylvania	853	582	748	636	780	744	806	718	704	727	800	685	8, 783
Texas	97, 353	90, 108	94, 813	87, 621	93, 064	95, 580	92, 304	93, 566	88, 720	86, 894	94, 294	101, 650	1, 115, 967
Utah	204	190	160	145	164	143	184	273	229	254	236	262	2, 444
West Virginia	189	178	202	167	222	190	220	206	154	221	160	125	2, 234
Wyoming	9, 412	9, 427	8, 346	6, 659	7, 268	8, 911	8, 762	9, 678	8, 256	8, 536	9, 123	9, 475	103, 853
Total domestic crude	225, 657	210, 991	220, 569	202, 922	219, 481	216, 395	218, 937	219, 358	213, 413	208, 233	222, 575	238, 295	2, 616, 826
Foreign crude	26, 430	24, 759	27, 839	24, 514	28, 159	29, 227	31, 909	31, 770	30, 606	30, 691	28, 552	27, 430	341, 886
Grand total, 1956	252, 087	235, 750	248, 408	227, 436	247, 640	245, 622	250, 846	251, 128	244, 019	238, 924	251, 127	265, 725	2, 958, 712
Daily average:													
Domestic crude	7, 279	7, 276	7, 115	6, 764	7, 080	7, 213	7, 063	7, 076	7, 114	6, 717	7, 419	7, 687	7, 150
Domestic and foreign crude	8, 132	8, 129	8, 013	7, 581	7, 988	8, 187	8, 092	8, 101	8, 134	7, 707	8, 371	8, 572	8, 084
Pennsylvania Grade (included above)	1, 403	1, 093	1, 298	1, 072	1, 319	1, 312	1, 389	1, 245	1, 210	1, 318	1, 305	1, 161	15, 125
1957 [1]													
Alabama	348	444	435	359	492	387	343	491	474	719	387	582	5, 461
Arkansas	2, 734	2, 900	2, 753	2, 376	2, 608	2, 569	2, 585	1, 957	2, 838	2, 424	2, 633	2, 389	30, 766
California	29, 601	25, 991	30, 593	26, 735	28, 774	26, 161	27, 019	28, 376	27, 677	28, 282	25, 553	27, 644	332, 406
Colorado	5, 292	4, 623	4, 713	4, 781	4, 391	4, 294	4, 978	3, 925	4, 572	4, 167	4, 993	4, 238	54, 967
Florida	29	54	10	15	1	24	100	53	51	32	83	---------	452

Illinois	8,080	6,464	7,018	6,462	6,738	4,819	4,889	5,684	6,828	6,993	7,147	7,394	78,516
Indiana	1,081	1,036	1,147	1,099	1,214	902	968	1,037	1,098	1,114	1,067	1,085	12,848
Kansas	11,332	9,467	9,654	8,030	10,429	10,600	10,289	10,626	10,531	11,424	9,123	10,514	122,019
Kentucky	1,698	1,328	1,468	1,435	1,369	1,391	1,208	1,381	1,159	1,479	1,334	1,529	16,779
Louisiana	30,952	27,863	32,769	28,558	28,569	25,656	26,464	24,929	23,076	23,388	23,242	27,186	322,652
Michigan	866	808	952	800	794	878	925	1,003	882	933	758	776	10,375
Mississippi	3,259	4,133	3,586	2,624	4,185	2,569	3,475	3,205	2,774	4,044	2,912	2,872	39,638
Missouri, Nevada, South Dakota, Tennessee, Virginia	11	11	10	11	10	10	12	9	11	14	18	17	144
Montana	1,907	2,684	2,063	2,134	2,427	2,628	1,883	2,218	2,412	2,134	2,519	2,562	27,571
Nebraska	1,492	1,336	1,476	1,821	1,004	1,480	1,935	1,480	1,542	2,202	1,460	2,453	19,681
New Mexico	7,819	8,030	8,604	7,204	7,718	7,803	6,523	8,268	7,942	7,537	8,331	7,838	93,617
New York	214	208	228	237	237	190	231	244	227	235	218	227	2,696
North Dakota	1,304	1,132	1,292	1,065	1,253	1,193	1,204	1,260	566	1,052	878	1,362	13,561
Ohio	452	417	306	367	397	410	400	421	554	542	461	607	5,334
Oklahoma	20,498	17,852	20,102	18,955	18,449	16,714	16,712	18,964	16,927	17,871	18,020	18,447	219,511
Pennsylvania	715	547	719	571	726	665	570	568	780	633	567	723	7,784
Texas	101,948	86,477	103,110	92,287	91,164	85,409	86,841	88,611	86,446	83,076	82,453	86,490	1,074,312
Utah	352	275	368	314	218	273	292	323	347	408	383	431	3,984
West Virginia	195	129	194	192	163	144	191	150	210	167	207	206	2,148
Wyoming	9,071	8,925	8,859	8,191	8,411	8,801	9,533	10,219	8,910	9,317	8,485	9,714	108,436
Total domestic crude	241,250	213,134	242,429	216,623	221,741	205,970	209,570	215,402	208,834	210,187	203,232	217,286	2,605,658
Foreign crude	25,655	23,891	24,538	26,439	31,709	33,928	37,008	39,769	32,836	30,589	32,225	29,989	368,576
Grand total, 1957	266,905	237,025	266,967	243,062	253,450	239,898	246,578	255,171	241,670	240,776	235,457	247,275	2,974,234
Daily average:													
Domestic crude	7,782	7,612	7,820	7,221	7,153	6,866	6,760	6,948	6,961	6,780	6,774	7,009	7,139
Domestic and foreign crude	8,610	8,465	8,612	8,102	8,176	7,997	7,954	8,231	8,056	7,767	7,849	7,977	8,149
Pennsylvania Grade (included above)	1,269	1,005	1,210	1,111	1,250	1,113	1,129	1,024	1,376	1,203	1,087	1,310	14,087

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[1] Preliminary figures.

STOCKS

At the end of 1957 total stocks of all oils were 60.9 million barrels higher than at the end of 1956. Stocks of refined products increased 44.1 million barrels, crude-oil stocks 15.8 million barrels, and natural-gas-liquid stocks 1.0 million barrels.

Heavy exports to Europe, which began in November 1956, resulted in crude-oil stocks dropping to 254.9 million barrels at the end of March 1957. The emergency shipments ended with the reopening of the Suez Canal in May. A slow cutback in the high rate of production that was maintained to supply European oil needs resulted in stocks of crude oil building up rapidly and reaching an alltime high of 288.2 million barrels by the end of July.

The demand for petroleum products in 1957 failed to reach the peak expected by refiners, and stocks built up to a record level of 551.1 million barrels by the end of October.

TABLE 34.—Stocks of crude petroleum, natural-gas liquids, and refined products in continental United States at end of year, 1953–57

(Thousand barrels)

Product	1953	1954	1955	1956	1957
Crude petroleum:					
At refineries	72,738	67,309	66,852	71,721	76,576
Pipeline and tank farm	182,934	172,081	178,771	173,278	183,526
Producers	18,773	18,995	19,987	21,015	21,711
Total crude petroleum	274,445	258,385	265,610	266,014	281,813
Natural-gas liquids	10,428	14,038	13,564	20,559	21,567
Refined products	440,634	442,510	435,685	493,818	537,937
Grand total	725,507	714,933	714,859	780,391	841,317

TABLE 35.—Stocks of crude petroleum in continental United States in 1957, by States of origin and months [1]

(Thousand barrels)

State of origin	Jan. 1	Jan. 31	Feb. 28	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Alabama	555	561	447	420	513	509	610	783	742	730	482	552	460
Arkansas	3,204	3,076	2,672	2,586	2,757	2,742	2,656	2,591	3,144	2,827	2,967	2,864	3,035
California	28,979	28,477	28,802	27,041	28,182	28,150	29,738	31,530	31,990	32,335	32,788	35,129	36,241
Colorado	3,552	3,175	2,998	3,151	3,016	3,368	3,473	3,140	3,806	3,683	3,983	3,276	3,452
Florida	128	138	119	147	170	211	223	161	147	135	141	98	137
Illinois	9,660	8,590	8,272	7,769	7,779	7,896	8,344	9,115	9,296	9,294	9,647	9,425	9,422
Indiana	375	411	412	378	379	309	452	497	504	467	445	392	386
Kansas	10,466	9,473	9,393	9,379	11,425	11,601	11,000	11,100	10,651	9,812	9,362	10,041	10,152
Kentucky	1,723	1,465	1,453	1,409	1,377	1,439	1,412	1,681	1,742	1,968	1,947	1,935	1,823
Louisiana	18,697	18,651	19,511	17,783	18,372	18,951	18,191	18,272	17,796	18,481	19,753	20,496	19,244
Michigan	979	998	997	901	969	1,061	1,005	977	824	778	714	740	773
Mississippi	2,897	3,125	2,277	2,180	2,990	2,366	3,033	2,725	2,416	2,593	2,433	2,387	2,461
Montana	3,028	3,244	2,544	2,732	2,771	2,621	2,266	2,763	2,938	2,844	3,067	2,828	2,672
Nebraska	1,386	1,356	1,433	1,567	1,289	1,776	1,801	1,498	1,816	2,014	1,597	1,912	1,291
New Mexico	7,323	7,441	6,875	6,769	7,503	7,786	7,436	8,869	8,554	7,996	8,417	8,072	8,465
New York	102	106	109	104	102	108	133	140	122	113	105	94	83
North Dakota	736	728	710	826	665	649	655	697	686	943	777	962	817
Ohio	608	562	533	628	697	743	746	855	897	832	819	840	752
Oklahoma	23,016	21,545	21,704	21,826	21,460	21,635	21,344	21,919	20,250	20,050	19,915	18,986	18,616
Pennsylvania	1,402	1,384	1,486	1,465	1,601	1,621	1,636	1,785	1,913	1,785	1,844	1,897	1,797
South Dakota								1	1	1	1	3	1
Texas	116,388	111,170	114,936	115,423	119,742	126,189	133,278	132,357	129,315	127,582	128,007	127,163	125,888
Utah	58	39	53	65	47	70	61	72	72	82	92	79	167
West Virginia	620	606	645	626	620	648	677	686	724	698	731	706	687
Wyoming	17,117	17,308	17,120	17,183	17,468	18,162	17,673	16,830	15,339	15,398	15,326	15,735	15,297
Total domestic crude	252,999	243,629	245,501	242,286	251,894	260,611	267,843	271,044	265,685	263,441	265,360	266,612	264,119
Foreign [2]	13,015	12,615	10,843	12,625	13,902	15,352	16,469	17,197	17,703	17,028	19,157	15,157	17,694
Grand total	266,014	256,244	256,344	254,911	265,796	275,963	284,312	288,241	283,388	280,469	284,517	281,769	281,813
Pennsylvania Grade (includes above)	2,351	2,292	2,427	2,426	2,572	2,637	2,704	2,884	3,079	2,882	2,944	2,990	2,833

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[1] Final figures.

[2] Includes foreign crude petroleum held in District 5: December 1956, 2,845,000; January, 3,231,000; February, 2,250,000; March, 3,479,000; April, 2,598,000; May, 3,227,000; June, 3,184,000; July, 4,391,000; August, 4,430,000; September, 5,313,000; October, 5,813,000; November, 4,630,000; December, 6,712,000 barrels.

TABLE 36.—Stocks of crude petroleum in continental United States in 1957, by location and months [1]

(Thousand barrels)

State	Jan. 1	Jan. 31	Feb. 28	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Alabama	621	599	725	727	654	799	746	637	667	619	526	625	540
Arkansas	2,649	2,496	2,369	2,288	2,701	2,651	2,524	2,532	2,613	2,381	2,673	2,532	2,613
California, Oregon, Washington	31,824	31,708	31,052	30,520	30,780	31,377	32,922	35,921	36,420	37,648	38,601	39,759	42,953
Colorado	1,860	1,760	1,761	1,739	1,952	1,954	1,782	1,761	1,909	1,959	1,801	1,851	1,717
Florida, Georgia, South Carolina, Virginia	1,002	920	899	782	942	792	1,066	1,040	981	885	972	772	575
Illinois	16,838	15,902	15,368	15,360	16,190	16,875	16,257	17,031	16,659	16,347	16,124	15,963	14,942
Indiana	4,643	4,640	4,485	4,559	4,474	4,482	4,373	4,282	4,312	4,523	4,882	4,616	4,615
Iowa, Missouri	6,572	6,808	7,054	6,614	6,374	6,693	7,306	7,204	7,299	6,815	6,979	7,105	6,837
Kansas	10,640	10,201	10,127	9,862	11,781	11,848	12,144	11,797	11,045	10,521	11,176	11,521	11,267
Kentucky, Tennessee	3,394	3,278	2,985	3,220	3,346	3,172	3,274	3,569	3,443	3,702	3,669	3,695	3,525
Louisiana	14,908	15,064	15,590	14,556	13,737	15,285	14,828	15,117	14,848	14,911	15,634	15,478	15,759
Maryland	1,235	1,466	1,386	1,177	1,378	1,184	1,535	1,305	1,190	946	997	867	1,042
Massachusetts, Delaware, Rhode Island	2,087	1,986	1,721	1,380	2,327	2,491	2,359	2,001	2,327	2,455	2,065	2,511	2,444
Michigan	1,651	1,657	1,707	1,731	1,680	1,862	1,710	1,740	1,539	1,436	1,372	1,381	1,519
Minnesota, Wisconsin	1,186	1,224	1,209	995	1,163	1,199	1,286	1,122	1,020	1,442	1,658	1,356	1,405
Mississippi	1,739	1,854	1,761	1,673	1,797	1,854	1,891	1,839	1,857	1,753	1,678	1,631	1,694
Montana	2,740	2,698	2,009	2,093	2,188	2,099	2,026	1,999	1,857	1,910	2,065	2,050	1,857
Nebraska	1,561	1,515	1,530	1,598	1,566	1,828	1,693	1,785	1,769	1,604	1,614	1,766	1,737
New Jersey	5,507	5,489	5,628	5,884	6,131	5,495	5,230	4,883	5,696	5,584	5,781	5,451	5,789
New Mexico	2,833	2,879	2,911	2,780	2,608	2,705	2,548	2,666	2,705	2,734	2,700	2,595	2,725
New York	1,192	848	703	1,324	1,333	1,519	1,237	1,072	1,039	934	865	828	768
North Dakota	704	721	678	814	648	633	637	671	665	923	722	931	785
Ohio	7,966	7,326	6,720	7,244	7,631	7,555	8,770	8,947	8,123	8,093	8,219	7,914	7,906
Oklahoma	25,213	21,693	20,975	20,927	22,571	23,275	23,771	24,570	24,335	23,770	23,253	23,151	23,023
Pennsylvania	9,430	9,704	9,917	9,823	10,370	10,255	11,832	11,422	11,506	10,292	11,543	11,210	9,857
Texas	94,440	90,217	93,861	94,215	98,045	103,691	109,036	110,158	106,786	105,664	106,725	104,544	103,689
Utah	714	537	555	627	612	773	698	777	756	752	679	788	978
West Virginia	604	616	644	625	635	683	718	721	732	732	689	696	681
Wyoming	10,261	10,438	10,014	9,774	10,182	10,934	10,113	9,672	9,290	9,134	8,855	8,182	8,571
Total	266,014	256,244	256,344	254,911	265,796	275,963	284,312	288,241	283,388	280,469	284,517	281,769	281,813

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[1] Final figures.

TABLE 37.—Stocks of crude petroleum in continental United States in 1957, by classification and location [1]

(Thousand barrels)

Classification and location	Jan. 1	Jan. 31	Feb. 28	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
At refineries:													
Alabama	364	240	412	320	338	370	337	271	229	259	248	285	296
Arkansas	488	426	381	340	520	451	404	484	511	419	505	408	511
California, Oregon, Washington	11, 268	12, 259	11, 486	12, 008	12, 340	12, 473	12, 805	14, 205	15, 107	15, 030	15, 600	15, 701	17, 273
Colorado	257	248	210	248	388	263	234	226	242	318	313	194	207
Florida, Georgia, South Carolina, Virginia	874	860	805	650	889	697	934	982	884	750	913	674	438
Illinois	4, 230	4, 241	4, 125	3, 778	4, 133	4, 229	3, 910	3, 913	4, 110	4, 174	4, 227	3, 805	3, 607
Indiana	2, 186	2, 173	1, 921	2, 128	2, 017	2, 074	1, 961	1, 902	1, 757	2, 022	2, 049	1, 939	1, 780
Kansas	1, 521	1, 597	1, 712	1, 446	2, 005	1, 894	1, 649	1, 604	1, 549	1, 197	1, 127	1, 070	1, 242
Kentucky, Tennessee	1, 058	980	802	1, 091	1, 199	1, 090	986	1, 053	1, 068	1, 204	1, 156	1, 317	1, 047
Louisiana	5, 655	4, 912	5, 850	5, 147	5, 118	5, 868	5, 108	5, 502	5, 255	5, 265	5, 856	5, 128	5, 823
Maryland	1, 235	1, 466	1, 386	1, 177	1, 378	1, 184	1, 535	1, 305	1, 190	946	997	867	1, 042
Massachusetts, Delaware, Rhode Island	2, 087	1, 986	1, 721	1, 380	2, 327	2, 491	2, 359	2, 001	2, 327	2, 455	2, 065	2, 511	2, 444
Michigan	946	872	925	911	819	914	922	934	833	722	661	657	763
Minnesota, Wisconsin	1, 186	1, 224	1, 209	995	1, 163	1, 199	1, 286	1, 122	1, 020	1, 442	1, 658	1, 356	1, 405
Mississippi	6	20	21	24	23	26	23	25	22	22	22	20	29
Missouri	339	395	396	384	368	390	381	395	389	317	310	337	336
Montana	762	673	582	634	758	679	520	689	530	570	724	723	772
Nebraska	52	48	47	64	58	40	46	60	41	27	58	69	45
New Jersey	5, 265	5, 366	5, 506	5, 884	6, 008	5, 495	5, 230	4, 883	5, 696	5, 584	5, 667	5, 334	5, 789
New Mexico	312	202	191	247	209	239	220	196	204	280	260	254	218
New York	953	617	500	1, 114	1, 102	1, 278	1, 007	835	793	718	651	588	527
North Dakota	343	339	330	376	261	235	243	260	263	521	319	433	399
Ohio	1, 826	1, 804	1, 519	1, 764	1, 942	2, 106	2, 223	1, 927	1, 638	1, 787	1, 944	1, 686	1, 758
Oklahoma	3, 350	3, 474	3, 485	3, 767	3, 791	3, 660	3, 389	3, 074	2, 931	2, 917	2, 995	2, 816	3, 172
Pennsylvania	7, 908	8, 221	8, 356	8, 263	8, 722	8, 399	9, 982	9, 459	9, 305	8, 258	9, 468	9, 168	7, 975
Texas	15, 778	14, 460	15, 494	14, 723	15, 572	17, 125	18, 154	17, 159	16, 414	15, 920	16, 556	15, 546	16, 153
Utah	495	306	307	386	392	516	467	552	499	489	423	512	559
West Virginia	38	64	57	53	59	61	44	50	58	51	50	49	41
Wyoming	939	851	877	1, 068	1, 051	1, 056	851	893	976	911	915	893	925
Total at refineries	71, 721	70, 324	70, 613	70, 370	74, 950	76, 502	77, 210	75, 961	75, 841	74, 575	77, 737	74, 340	76, 576

Footnote on p. 392

TABLE 37.—Stocks of crude petroleum in continental United States in 1957, by classification and location—Continued

(Thousand barrels)

Classification and location	Jan. 1	Jan. 31	Feb. 28	Mar 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept 30	Oct. 31	Nov. 30	Dec. 31
Pipeline and tank-farm stocks:													
Alabama	235	334	291	380	292	394	378	334	391	322	238	303	204
Arkansas	1, 771	1, 695	1, 613	1, 528	1, 811	1, 830	1, 750	1, 683	1, 747	1, 587	1, 803	1, 754	1, 737
California	15, 132	14, 007	14, 151	13, 050	13, 039	13, 211	14, 598	16, 273	15, 855	17, 264	17, 819	18, 965	20, 542
Colorado	1, 343	1, 262	1, 311	1, 261	1, 334	1, 461	1, 303	1, 305	1, 432	1, 421	1, 208	1, 387	1, 250
Florida, New Jersey	356	170	208	124	167	86	124	50	90	124	164	206	125
Illinois	12, 013	11, 071	10, 653	10, 987	11, 497	12, 086	11, 692	12, 478	11, 924	11, 568	11, 322	11, 578	10, 765
Indiana	2, 392	2, 402	2, 499	2, 366	2, 392	2, 343	2, 342	2, 310	2, 485	2, 431	2, 768	2, 612	2, 770
Iowa, Missouri	6, 233	6, 413	6, 658	6, 230	6, 006	6, 303	6, 925	6, 809	6, 910	6, 498	6, 669	6, 768	6, 501
Kansas	8, 249	7, 774	7, 585	7, 546	8, 926	9, 124	9, 635	9, 363	8, 676	8, 484	9, 219	9, 601	9, 200
Kentucky, Tennessee	2, 271	2, 238	2, 118	2, 064	2, 082	2, 017	2, 223	2, 456	2, 310	2, 438	2, 543	2, 318	2, 423
Louisiana	7, 483	8, 197	7, 920	7, 474	6, 819	7, 587	7, 715	7, 790	7, 698	7, 686	7, 703	8, 195	7, 866
Michigan	550	630	627	660	711	798	633	641	541	549	546	559	601
Mississippi	1, 358	1, 459	1, 365	1, 264	1, 384	1, 473	1, 438	1, 389	1, 385	1, 336	1, 266	1, 186	1, 245
Montana	1, 653	1, 700	1, 102	1, 119	1, 080	1, 085	1, 156	970	972	975	951	932	720
Nebraska	1, 414	1, 347	1, 368	1, 419	1, 383	1, 663	1, 527	1, 600	1, 608	1, 462	1, 436	1, 577	1, 562
New Mexico	1, 551	1, 677	1, 730	1, 508	1, 409	1, 456	1, 308	1, 420	1, 371	1, 284	1, 255	1, 136	1, 362
New York	209	201	173	180	201	211	200	207	216	186	184	210	211
North Dakota	200	200	200	202	202	202	203	203	203	200	203	206	201
Ohio	6, 060	5, 442	5, 121	5, 400	5, 609	5, 369	6, 467	6, 935	6, 405	6, 226	6, 195	6, 148	6, 068
Oklahoma	20, 378	16, 699	15, 975	15, 575	17, 165	18, 005	18, 667	19. 811	19, 799	19, 178	18, 628	18, 730	18, 336
Pennsylvania	1, 367	1, 333	1, 411	1, 410	1, 498	1, 706	1, 700	1, 818	2, 056	1, 889	1, 930	1, 897	1, 732
Texas	71, 837	68, 707	71, 397	72, 027	75, 198	79, 356	82, 907	85, 359	82, 627	81, 699	82, 249	81, 003	80, 291
Utah	195	211	228	221	200	237	211	209	233	233	226	245	388
West Virginia	401	387	422	407	411	457	509	506	509	516	474	482	475
Wyoming	8, 627	8, 827	8, 412	7, 961	8, 431	9, 193	8, 557	8, 139	7, 654	7, 488	7, 220	6, 559	6, 951
Total pipeline and tank-farm stocks	173, 278	164, 383	164, 538	162, 363	169, 247	177, 653	184, 168	190, 058	185, 097	183, 044	184, 129	184, 557	183, 526
Producers' stocks	21, 015	21, 537	21, 193	22, 178	21, 599	21, 808	22, 934	22, 222	22, 450	22, 850	22, 651	22, 872	21, 711
Grand total: 1957	266, 014	256, 244	256, 344	254, 911	265, 796	275, 963	284, 312	288, 241	283, 388	280, 469	284, 517	281, 769	281, 813
1956	265, 610	261, 592	259, 504	265, 683	277, 121	277, 497	274, 491	277, 008	279, 944	278, 791	286, 560	275, 995	266, 014

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[1] Final figures.

VALUE AND PRICE

The average value of crude oil at the well in 1957 was $3.09 per barrel—30 cents above the 1956 average. The total value of crude oil at the well was $8,080 million in 1957.

There was a general increase in posted prices at the well in January 1957, and prices remained almost constant for the balance of the year.

TABLE 38.—Value of crude petroleum at wells in the United States, 1956–57, by States

State	1956		1957 [1]	
	Total value at wells (thousand dollars)	Average value per barrel	Total value at wells (thousand dollars)	Average value per barrels
Arkansas	78, 965	$2. 69	89, 343	$2. 92
California	918, 975	2. 62	1, 035, 920	3. 05
Colorado	162, 674	2. 78	165, 698	3. 02
Illinois	241, 274	2. 93	244, 227	3. 12
Indiana	33, 733	2. 93	40, 249	3. 13
Kansas	346, 529	2. 79	366, 332	3. 01
Kentucky	51, 297	2. 91	52, 831	3. 13
Louisiana:				
Gulf Coast	742, 332	2. 94	922, 650	3. 33
Northern	135, 619	2. 89	149, 451	3. 24
Total Louisiana	877, 951	2. 93	1, 072, 101	3. 32
Michigan	30, 824	2. 87	31, 117	3. 06
Mississippi	100, 019	2. 45	114, 078	2. 91
Montana	56, 141	2. 58	73, 481	2. 70
Nebraska	45, 209	2. 79	58, 368	2. 98
New Mexico				
Southeastern	(2)	(2)	275, 798	2. 99
Northwestern	(2)	(2)	7, 330	2. 91
Total New Mexico	241, 706	2. 75	283, 128	2. 99
New York	12, 091	4. 40	12, 662	4. 73
North Dakota	39, 136	2. 90	42, 699	3. 13
Ohio	15, 025	3. 14	17, 694	3. 23
Oklahoma	600, 096	2. 78	651, 786	3. 03
Pennsylvania	35, 718	4. 34	38, 687	4. 73
Texas [3]				
Gulf Coast	676, 710	3. 00	723, 193	3. 41
East Texas proper	224, 212	2. 89	226, 506	3. 20
West Texas	1, 250, 334	2. 75	1, 393, 362	3. 00
Other districts	979, 969	2. 80	1, 026, 310	3. 05
Total Texas	3, 131, 225	2. 83	3, 369, 371	3. 11
West Virginia	8, 411	3. 86	9, 436	4. 26
Wyoming	255, 785	2. 44	283, 599	2. 66
Other States [4]	13, 976	2. 26	26, 697	2. 65
Total United States	7, 296, 760	2. 79	8, 079, 504	3. 09

[1] Preliminary figures.
[2] Not available.
[3] Texas Railroad Commission divisions.
[4] Alabama, Florida, Missouri, Nevada, South Dakota, Tennessee, Utah, and Virginia.

TABLE 39.—Posted price per barrel of petroleum at wells in the United States in 1957, by grade, with date of change [1]

Date	Pennsylvania Grade		Corning Grade	Western Kentucky	Indiana-Illinois Basin	Midland, Mich.	Oklahoma-Kansas	
	Bradford and Allegheny districts	In southwest Pennsylvania					34°-34.9°	36°-36.9°
Jan. 1	$4.68	$4.21	$2.72	$2.90	$2.90	$3.08	$2.78	$2.82
Jan. 7	--------	--------	--------	--------	--------	--------	3.13	--------
Jan. 8	--------	--------	--------	--------	--------	--------	3.03	--------
Jan. 9	--------	--------	2.97	3.15	--------	3.25	--------	--------
Jan. 10	--------	--------	2.90	--------	--------	--------	--------	--------
Jan. 16	4.88	4.41	--------	--------	--------	--------	--------	--------
July 26	4.65	4.18	--------	--------	--------	--------	--------	--------
Sept. 1	--------	--------	--------	--------	--------	--------	--------	3.07
Nov. 1	--------	--------	--------	--------	--------	3.10	--------	--------
Dec. 13	--------	--------	--------	3.00	--------	--------	--------	--------

Date	Panhandle Texas (Carson, Gray, Hutchinson, and Wheeler Counties), 35°-35.9°	West Texas, 30°-30.9° (sweet)	Lea County, N. Mex., 30°-30.9° (sour)	South Texas, Mirando, 24°-24.9°	East Texas	Gulf Coast			
						Conroe, Tex.	Texas		Louisiana, 30°-30.9°
							30°-30.90	20°-20.9°	
Jan. 1	$2.80	$2.70	$2.57	$3.01	$2.90	$3.13	$2.90	$2.70	$2.85
Jan. 3	--------	--------	--------	3.43	--------	3.53	3.35	3.15	--------
Jan. 7	3.02	--------	--------	--------	--------	--------	--------	--------	3.25
Jan. 8	3.05	2.95	2.82	--------	--------	--------	--------	--------	--------
Jan. 9	2.92	--------	--------	--------	--------	--------	--------	--------	--------
Feb. 1	--------	--------	--------	--------	--------	--------	--------	3.10	--------
Feb. 6	--------	--------	--------	--------	--------	--------	3.30	--------	--------
July 16	--------	--------	--------	3.23	--------	--------	--------	--------	--------

Date	Rodessa, La., 36°-36.9°	Smackover, Ark.	Elk Basin, Mont. and Wyo., 30°-30.9°	California			
				Coalinga, 32-32.9°	Kettleman Hills, 37°-37.9°	Midway-Sunset, 19°-19.9°	Wilmington, 24°-24.9°
Jan. 1	$2.82	$2.33	$2.39	$3.12	$3.30	$2.62	$2.88
Jan. 7	3.17	--------	--------	--------	--------	--------	--------
Jan. 8	--------	2.68	2.63	--------	--------	--------	--------
Jan. 17	--------	--------	--------	3.37	3.55	2.87	3.13

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[1] Source: Platt's Oil Price Handbook and Oilmanac, 1957, compiled and published by McGraw-Hill Publishing Co., Inc.

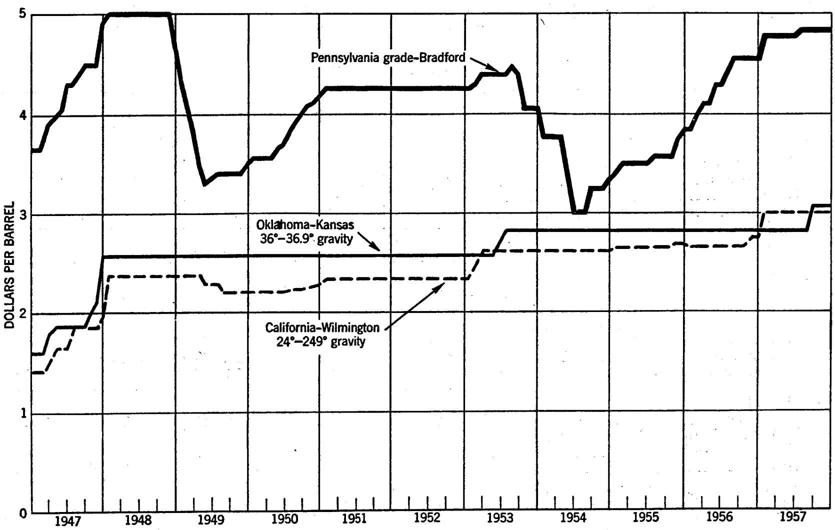

FIGURE 4.—Posted prices of selected grades of crude petroleum in the United States, 1947–57, by months.

REFINED PRODUCTS

GENERAL REVIEW

Petroleum is consumed in many finished products that must be considered individually. Competition with other fuels and economic and climatic conditions influence consumption of these products.

Gasoline is consumed principally in highway transport, aviation, and mechanized farming. The demand for kerosine (a product defined as meeting lamp-oil specifications for color and flashpoint) has been drastically affected, especially in rural areas, by the increased competition from electricity and liquefied petroleum. Distillate fuel oil, including light diesel oils, is used for space heating and for diesel locomotive fuel and has nearly replaced residual fuel oil and coal in railroad use. Residual fuel oil usually sells for less than crude oil at the refineries and competes directly with natural gas and coal for heavy fuel uses. As it cannot be moved by pipeline, its distribution depends on cheap water transport and limited tank-car movement. Therefore, it cannot normally compete with coal in coal-producing areas. Liquefied gases, in competition with kerosine and light distillate fuel oil in domestic use, are gaining in importance as fuel in internal-combustion engines and as the initial raw material in synthesizing many petrochemicals. Jet fuels (a blend of gasoline, kerosine, and distillate fuel oils) are replacing gasoline in military combat aircraft.

TABLE 40.—Salient statistics of the major refined petroleum products in continental United States, 1953–57

(Thousand barrels)

	1953	1954	1955	1956	1957 [1]
Gasoline (finished and natural):					
Production	1, 266, 376	1, 261, 304	1, 373, 950	1, 428, 807	1, 438, 408
Imports	459	1, 185	4, 809	1, 682	[2] 2, 905
Exports	37, 295	34, 366	34, 521	35. 572	38, 554
Stocks, end of year	157, 872	155, 400	165, 433	187, 271	196. 776
Domestic demand	1, 205, 775	1, 230, 595	1, 334, 205	1, 373, 079	1, 393, 254
Kerosine:					
Production	123, 200	122, 305	117, 137	123. 480	108, 929
Transfers from gasoline plants [3]	----------	----------	1, 950	1, 781	1, 780
Imports	----------	----------	----------	10	30
Exports	7, 265	4, 852	3, 335	3, 297	5, 287
Stocks, end of year	[4] 28, 684	27, 826	26, 770	31, 420	29, 200
Domestic demand	114, 467	118, 311	116, 808	117, 324	107, 672
Distillate fuel oil:					
Production	528, 111	542, 278	602, 547	665, 687	668, 573
Transfers from gasoline plants [3]	----------	----------	615	818	866
Transfers from crude	1, 966	1, 500	1, 347	1, 375	1, 305
Imports	3, 379	3, 195	4, 413	5, 159	8, 527
Exports	32, 328	24, 223	24, 605	34, 535	46, 715
Stocks, end of year	[4] 111, 741	108, 144	111, 333	133, 981	149, 449
Domestic demand	488, 075	526, 347	581, 128	615, 856	617, 088
Residual fuel oil:					
Production	449, 979	416. 757	420, 331	426, 699	415, 656
Transfers from crude	5, 617	5, 924	5, 559	6. 439	13. 884
Imports	131, 533	129, 124	152, 035	162, 869	173, 201
Exports	25, 991	26, 753	33, 799	27, 877	37, 791
Stocks, end of year	49, 370	52, 105	39, 174	44, 491	59, 959
Domestic demand	560. 474	522, 317	557, 057	562, 813	549, 482
Jet fuel:					
Production	35, 747	46, 550	56, 648	66, 443	63, 322
From gasoline	25, 086	32, 889	43, 262	51, 472	46, 007
From kerosine	6, 551	9, 934	9, 887	11, 124	12, 572
From distillate	4, 110	3, 727	3, 499	3, 847	4, 743
Imports [5]	----------	----------	----------	7, 763	7, 373
Exports	409	149	120	186	119
Stocks, end of year	2, 666	3, 215	3, 457	5, 322	4, 749
Domestic demand	34, 483	45, 852	56, 286	72, 155	71, 149
Lubricants:					
Production	52. 545	53, 243	55, 836	59, 211	55, 723
Imports	----------	1	----------	----------	----------
Exports:					
Grease	325	412	440	428	431
Oil	12. 674	14, 663	13, 858	13, 431	13, 364
Stocks, end of year	10, 070	9, 702	8. 763	10, 182	10. 864
Domestic demand	40. 497	38, 537	42, 477	43, 933	41, 246
Wax (1 barrel=280 pounds):					
Production	4. 978	5, 290	5, 293	5, 367	5, 461
Imports	----------	1	----------	----------	----------
Exports	1, 126	1, 342	1, 248	920	975
Stocks, end of year	538	562	551	658	666
Domestic demand	3. 889	3, 925	4, 056	4, 340	4, 478
Coke (5 barrels=1 short ton):					
Production	21, 607	24, 284	28, 337	31, 095	33, 466
Exports	3, 661	3, 261	4. 517	6, 423	5, 225
Stocks, end of year	860	2, 107	1, 524	1, 319	2, 534
Domestic demand	17, 599	19, 776	24, 403	24, 877	27, 026
Asphalt (5.5 barrels=1 short ton):					
Production	72, 409	74, 912	83, 121	90, 636	85, 683
Imports	2, 502	3, 394	3, 325	3, 606	6. 907
Exports	1, 710	1, 868	1, 567	1, 513	1, 808
Stocks, end of year	7, 314	7, 175	7, 768	9, 150	10, 463
Domestic demand	72, 208	76, 577	84, 286	91, 347	89, 469
Road oil:					
Production	6, 594	7, 213	8, 482	8, 027	7, 209
Stocks, end of year	437	434	560	501	587
Domestic demand	6, 610	7, 216	8, 356	8, 086	7, 123

See footnotes at end of table.

TABLE 40.—Salient statistics of the major refined petroleum products in continental United States, 1953–57—Continued

(Thousand barrels)

	1953	1954	1955	1956	1957 [1]
Still gas (1 barrel=3,600 cubic feet): Production	102,243	102,552	116,506	121,993	125,720
Liquified gases:					
Production [6]	33,306	34,169	43,615	51,962	53,437
Transfers of liquified gas [7] from natural gasoline plants	88,512	98,394	108,325	114,208	115,433
Exports	3,002	3,953	4,277	4,274	4,526
Stocks, end of year	792	941	1,032	1,393	1,913
Domestic demand	118,662	128,461	147,572	161,535	163,824
Miscellaneous:					
Production	9,091	11,013	10,806	12,493	15,816
Transfers from gasoline plants [3]	---	---	2,677	2,347	2,043
Exports	244	292	330	306	269
Stocks, end of year	1,001	1,236	1,327	1,476	1,811
Domestic demand	8,882	10,486	13,062	14,385	17,255
Unfinished gasoline:					
Rerun (net)	(8)	(8)	(8)	(8)	(8)
Stocks, end of year	(8)	(8)	(8)	(8)	(8)
Other unfinished oils:					
Rerun (net)	422	7,974	11,231	4,008	−1,355
Transfers of other products from natural gasoline plants	4,236	4,772	(4)	(4)	(4)
Imports	3,171	7,576	5,561	2,669	957
Stocks, end of year	69,289	73,663	67,993	66,654	68,966
Shortage	(7,184)	(8,468)	(12,356)	(15,704)	(15,159)

[1] Preliminary figures.
[2] Excludes jet fuel.
[3] Production at natural-gasoline plants shown as direct "transfers" and omitted from the input and output at refineries.
[4] Stocks figures as of Jan. 1, 1953, were revised to 27,216,000 barrels of kerosine and 98,688,000 of distillate fuel oil, new basis, because 1 company reported incorrectly.
[5] Imports of jet fuel formerly included with gasoline.
[6] Liquified refinery gases (LR-gases).
[7] Liquified petroleum gases (LP-gases).
[8] Included with gasoline (finished and natural).

The daily average total demand for all oils was 9,379,000 barrels, a 1.8-percent gain over the 1956 daily average of 9,209,000 barrels. Domestic demand increased 38,000 barrels daily (0.4 percent) over 1956, and exports were 132,000 barrels daily (30.3 percent) higher than in 1956. Exports in 1957 averaged 562,000 barrels daily compared with 430,000 barrels in 1956. During the first 5 months of 1957, when large shipments of crude oil and products were being sent to Europe to replace supplies shut off by the Middle East crisis, exports averaged 1,029,000 barrels daily. For the remainder of the year, exports averaged 232,000 barrels daily.

The increased domestic demand in 1957 was less than 0.2 percent, compared with a 4.1-percent gain in 1956. Industrial production for the first 3 quarters of 1957 was higher than for the corresponding quarters of 1956, but a large drop in the last quarter of 1957 resulted in totals for the 2 years being about equal.

Petroleum products delivered to the military forces from domestic sources averaged 379,000 barrels daily in 1957, a decline of 12.2 percent for the year. Jet fuel accounted for 47.5 percent of all military purchases in 1957.

The new supply of refined products comprises the refinery output from crude oil, the production of natural-gas liquids, a small quantity of motor benzol derived from coal, and imports of refined products from other countries. Crude runs to stills, the production of natural-gas liquids, and imports increased in 1957 at a rate exceeding demand, and stocks at the end of 1957 were 60.9 million barrels above those on December 31, 1956.

The gasoline yield from crude oil increased 1.0 percent in 1957. Kerosine and distillate-fuel-oil yields also were higher than in 1956, but the yield of residual fuel oil continued to decline. The higher gasoline yield, coupled with a smaller increase in demand than was anticipated, resulted in an increase in gasoline stocks of 9.5 million barrels for the year.

The monthly wholesale-price index for petroleum and petroleum products increased from 118.2 in 1956 to a new peak of 127.0 in 1957. The average wholesale price for the 4 principal products was 10.10 cents per gallon in 1957 compared with 9.43 cents in 1956. Gasoline was the only principal product with a higher wholesale price in December 1957 than in January 1957. Prices of kerosine, distillate fuel oils, and residual fuel oils reached their highest levels for 1957 in February, then continued to decline for the rest of the year.

TABLE 41.—Input and output of petroleum products at refineries in the United States, 1953–57

(Thousand barrels)

	1953	1954	1955	1956	1957 [1]
Input:					
Crude petroleum:					
Domestic	2,321,820	2,300,766	2,446,833	2,563,655	2,529.672
Foreign	233,045	238,798	283,385	341,451	360,764
Total crude petroleum	2,554,865	2,539,564	2,730,218	2,905,106	2,890,436
Natural-gas liquids	111,293	117,549	126,382	135,062	150,090
Total input	2,666,158	2,657,113	2,856,600	3,040,168	3.040,526
Output:					
Gasoline	1,233,954	1,232,989	1,331,528	1,396,787	1,415,335
Kerosine [2]	123,200	122,305	117,137	123,480	108,929
Distillate fuel oil [2]	528,111	542,278	602,547	665,687	668,573
Residual fuel oil	449,979	416,757	420,331	426,699	415,656
Jet fuel	35,747	46,550	56,648	66,443	63,322
Lubricants	52,545	53,243	55,836	59,211	55,723
Wax [3]	4,978	5,290	5,293	5,367	5,461
Coke [3]	21,607	24,284	28,337	31,095	33,466
Asphalt [3]	72,409	74,912	83,121	90,636	85,683
Road oil	6,594	7,213	8,482	8,027	7,209
Still gas [3]	102,243	102,552	116,506	121,993	125,720
Liquefied gases	33,306	34,169	43,615	51,962	53,437
Other finished products	9,091	11,013	10,806	12,493	15,816
Other unfinished oils (net)	[4] 422	[4] 7,974	[4] 11,231	[4] 4,008	1,355
Shortage (or overage) [5]	−7,184	−8,468	−12,356	−15,704	−15,159
Total output	2,666,158	2,657,113	2,856,600	3,040,168	3,040,526

[1] Preliminary figures.

[2] Production at natural-gasoline plants shown as direct "transfers" and omitted from the input and output at refineries.

[3] Conversion factors: 280 pounds of wax to the barrel; 5.0 barrels of coke to the short ton; 5.5 barrels of asphalt to the short ton; 3,600 cubic feet of still gas to the barrel.

[4] Negative quantity; represents net excess of unfinished oils rerun over unfinished oils produced.

[5] Includes losses or gains in volume during processing.

TABLE 42.—Percentage yields of refined petroleum products in the United States, 1948–57[1]

Product	1948[2]	1949	1950	1951	1952[3]	1953	1954	1955	1956	1957[4]
Finished products:										
Gasoline	40.1	43.7	43.0	42.4	42.4	43.9	43.8	44.0	43.4	43.8
Kerosine	6.0	5.2	5.6	5.7	5.3	4.8	4.8	4.3	4.2	3.8
Distillate fuel oil	18.5	17.5	19.0	20.0	21.2	20.7	21.3	22.0	22.9	23.1
Residual fuel oil	23.5	21.7	20.2	19.7	18.5	17.6	16.4	15.3	14.7	14.4
Jet fuel[5]	-------	-------	-------	-------	.8	1.4	1.8	2.1	2.3	2.2
Lubricating oil	2.5	2.3	2.5	2.6	2.3	2.1	2.1	2.0	2.0	1.9
Wax	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
Coke	.7	.9	.8	.8	.7	.8	1.0	1.0	1.1	1.2
Asphalt	2.5	2.5	2.8	2.8	2.9	2.8	2.9	3.0	3.1	3.0
Road oil	.4	.4	.3	.3	.3	.3	.3	.3	.3	.2
Still gas	4.0	4.2	4.0	4.1	3.9	4.0	4.0	4.3	4.2	4.3
Liquefied gases	(6)	(6)	(6)	(6)	1.3	1.3	1.3	1.6	1.8	1.9
Other finished products	1.5	1.4	1.6	1.7	.3	.4	.4	.4	.4	.5
Shortage	+.1	-------	-------	−.3	−.1	−.3	−.3	−.5	−.6	−.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Other unfinished oils added to crude in computing yields.
[2] Yields computed on the 1949 basis for California to compare with succeeding years.
[3] Yields computed on the 1953 basis to show jet fuel separately.
[4] Preliminary figures.
[5] From 1948 through 1951, jet fuel was included in statistics of gasoline, kerosine, and distillate fuel oil.
[6] From 1948 through 1951, liquefied gases statistics were included in "Other" finished products.

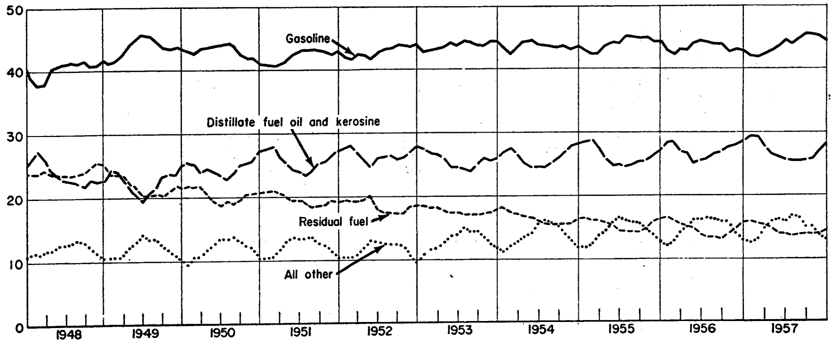

FIGURE 5.—Yields of principal products from crude runs to stills in the United States, 1948–57, by months.

TABLE 43.—Stocks of refined petroleum products in continental United States at end of month, 1956–57

(Thousand barrels)

Product	Jan. 31	Feb. 28	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
1956												
Gasoline [1]	329, 603	321, 812	310, 743	307, 837	321, 091	336, 018	365, 271	389, 287	409, 315	415. 736	405, 244	397, 163
Jet Fuel	4, 081	4, 148	4, 336	4, 178	4, 664	4, 372	4, 090	4, 574	4, 637	4, 424	4, 576	5, 322
Lubricating oil	9, 167	9, 309	9, 646	9, 725	9, 542	9, 754	9, 694	9, 547	9, 664	9, 536	10, 060	10, 182
Wax	538	566	517	502	550	566	566	577	608	605	611	658
Coke	1, 607	1, 666	1, 720	1, 734	1, 719	1, 712	1, 777	1, 704	1, 681	1, 540	1, 558	1, 319
Asphalt	9, 051	10, 608	12, 067	13, 187	12, 954	11, 423	9, 635	7, 680	6, 832	6, 601	7, 755	9, 150
Road oil	439	477	669	913	1, 076	1, 055	1, 032	712	711	575	507	501
Liquefied refinery gases	805	776	778	864	1, 007	1, 064	1, 125	1, 061	1, 285	1, 234	1. 166	1, 393
Miscellaneous	1, 416	1, 407	1, 645	1, 458	1, 389	1, 491	1, 562	1, 503	1, 358	1, 444	1, 350	1, 476
Other unfinished oils	65, 113	65, 296	66, 437	66, 553	69, 998	73, 025	74, 259	70, 400	70, 486	67, 095	69, 950	66, 654
Total 1956	421, 820	416, 065	408, 558	406, 951	423, 990	440, 480	469, 011	487, 045	506, 577	508, 790	502, 777	493, 818
1957												
Gasoline [1]	360, 696	347, 589	340, 555	339, 091	359, 564	381, 871	397, 561	420, 376	449, 066	451, 699	446, 222	435, 384
Jet fuel	5, 185	5, 326	4, 868	5, 322	5, 656	6, 321	5, 470	5, 248	5, 042	4, 681	4, 645	4, 749
Lubricating oil	10, 412	10, 308	10, 428	10, 587	10, 710	10, 591	10, 313	10, 124	10, 210	9, 953	10, 396	10, 864
Wax	661	632	670	707	706	728	706	658	662	655	655	666
Coke	1, 461	1, 686	1, 847	1, 723	1, 858	1, 972	2, 001	2, 006	2, 175	2, 296	2, 504	2, 534
Asphalt	10, 381	11, 314	12, 972	14, 606	15, 160	14, 435	11, 509	9, 970	8, 586	7, 863	8, 996	10, 463
Road oil	456	518	880	1, 085	1, 228	1, 226	957	842	677	600	594	587
Liquefied refinery gases	1, 317	1, 551	1, 749	1, 844	2, 141	2, 285	2, 258	2, 174	1, 977	2, 102	2, 012	1, 913
Miscellaneous	1, 341	1, 553	1, 734	1, 588	1, 507	1, 641	1, 509	1, 586	1, 707	1, 679	1, 741	1, 811
Other unfinished oils	62, 765	61, 547	65. 868	67, 153	70, 335	69, 743	70, 273	70, 479	69, 152	69, 522	72, 795	68, 966
Total 1957	454, 675	442, 024	441, 571	443, 706	468, 865	490, 813	502, 557	523, 463	549, 254	551, 050	550. 560	537, 937

[1] Includes kerosine, distillate fuel oil, residual fuel oil, and unfinished gasoline.

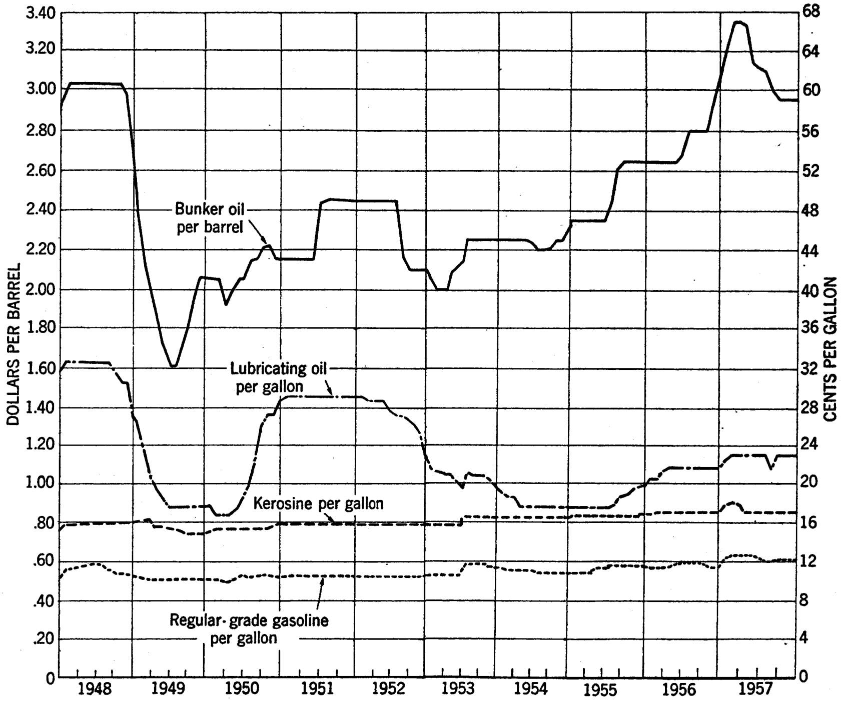

FIGURE 6.—Prices of Bunker "C" oil at New York Harbor, bright stock at Oklahoma refineries, tank-wagon kerosine at Chicago and Regular-Grade gasoline at refineries in Oklahoma, 1948–57, by months.

TABLE 44.—Input and output of petroleum products at refineries in the United States, 1956–57, by months

(Thousand barrels)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1956													
Input:													
Crude petroleum	248, 721	233, 374	245, 340	224, 623	244, 784	242, 119	248, 439	247, 851	240, 708	235, 842	240, 944	252, 361	2, 905, 106
Natural-gas liquids	10, 883	9, 507	10, 240	10, 092	10, 323	10, 273	10, 863	11, 118	11, 399	13, 455	13, 145	13, 764	135, 062
Total input	259, 604	242, 881	255, 580	234, 715	255, 107	252, 392	259, 302	258, 969	252, 107	249, 297	254, 098	266, 125	3, 040, 168
Output:													
Gasoline [1]	119, 130	108, 613	115, 758	106, 719	116, 438	116, 391	120, 201	121, 592	117, 075	115, 534	115, 780	123, 556	1, 396, 787
Kerosine [2]	11, 940	11, 165	10, 590	8, 978	9, 058	8, 704	9, 170	9, 716	9, 872	11, 044	11, 508	11, 735	123, 480
Distillate fuel oil [2]	59, 617	55, 622	56, 045	51, 387	51, 665	52, 640	54, 775	57, 007	55, 354	54, 917	55, 245	61, 413	665, 687
Residual fuel oil	41, 674	37, 291	37, 618	33, 892	35, 609	32, 951	33, 037	33, 823	31, 868	33, 543	35, 471	39, 922	426, 699
Jet fuel	4, 494	5, 053	5, 752	4, 961	6, 183	5, 615	5, 668	5, 890	5, 861	5, 619	5, 316	6, 031	66, 443
Lubricating oil	4, 985	4, 536	4, 996	5, 108	5, 164	5, 010	4, 749	5, 005	4, 706	5, 112	4, 970	4, 870	59, 211
Wax [3]	444	444	479	388	485	448	399	466	441	450	446	477	5, 367
Coke [3]	2, 657	2, 497	2, 616	2, 268	2, 477	2, 689	2, 759	2, 674	2, 593	2, 523	2, 596	2, 746	31, 095
Asphalt [3]	4, 433	4, 733	5, 948	6, 636	8, 072	9, 434	10, 025	10, 571	9, 805	9, 502	6, 572	4, 905	90, 636
Road oil	164	211	409	594	868	1, 270	1, 443	1, 222	990	414	228	214	8, 027
Still gas [3]	9, 435	8, 929	10, 276	9, 919	10, 975	11, 195	11, 320	11, 200	10, 200	9, 645	9, 137	9, 762	121, 993
Liquefied refinery gases	4, 516	4, 156	4, 243	4, 382	4, 431	4, 012	4, 568	4, 321	4, 296	4, 211	4, 146	4, 680	51, 962
Other miscellaneous [2]	832	773	935	953	1, 121	1, 173	1, 118	1, 020	1, 204	1, 259	959	1, 146	12, 493
Other unfinished oils (net)	[4] 3, 036	76	1, 061	[4] 77	3, 336	2, 814	981	[4] 4, 176	[4] 369	[4] 3, 670	2, 611	[4] 3, 559	[4] 4, 008
Shortage or overage	(1, 681)	(1, 218)	(1, 146)	(1, 393)	(775)	(1, 954)	(911)	(1, 362)	(1, 789)	(806)	(896)	(1, 773)	(15, 704)
Total output	259, 604	242, 881	255, 580	234, 715	255, 107	252, 392	259, 302	258, 969	252, 107	249, 297	254, 089	266, 125	3, 040, 168
1957 [5]													
Input:													
Crude petroleum	256, 485	226, 461	249, 445	232, 197	247, 760	236, 002	243, 412	250, 847	237, 606	237, 143	230, 773	242, 305	2, 890, 436
Natural-gas liquids	12, 702	10, 974	12, 296	11, 836	12, 158	11, 506	12, 414	13, 171	13, 193	13, 424	13, 224	13, 192	150, 090
Total input	269, 187	237, 435	261, 741	244, 033	259, 918	247, 508	255, 826	264, 018	250, 799	250, 567	243, 997	255, 497	3, 040, 526

Output:													
Gasoline [1]	122, 114	106, 088	116, 037	110, 611	118, 788	116, 436	118, 807	125, 287	121, 868	120, 747	115, 923	122, 629	1, 415, 335
Kerosine [2]	11, 384	9, 874	10, 307	8, 520	8, 440	7, 617	7, 718	7, 804	8, 284	8, 230	9, 709	11, 042	108, 929
Distillate fuel oil [2]	65, 662	56, 970	57, 680	52, 934	55, 444	53, 180	54, 236	55, 979	53, 164	52, 863	52, 006	58, 455	668, 573
Residual fuel oil	40, 990	35, 546	37, 351	33, 964	34, 196	33, 033	33, 776	33, 754	32, 987	32, 602	32, 059	35, 398	415, 656
Jet fuel	6, 207	5, 830	6, 800	6, 203	5, 813	4, 412	5, 514	5, 260	3, 702	4, 723	4, 245	4, 613	63, 322
Lubricting oil	4, 960	4, 334	4, 858	5, 124	5, 131	4, 246	4, 657	4, 704	4, 378	4, 476	4, 423	4, 432	55, 723
Wax [3]	460	376	499	473	468	421	446	430	462	498	450	478	5, 461
Coke [3]	2, 859	2, 539	2, 573	2, 604	2, 962	2, 795	2, 597	2, 812	2, 765	2, 997	2, 928	3, 035	33, 466
Asphalt [3]	3, 918	3, 909	5, 496	6, 538	8, 303	9, 012	9, 789	10, 505	9, 318	8, 085	6, 107	4, 703	85, 683
Road oil	157	219	544	460	698	1, 049	1, 174	1, 388	668	395	243	214	7, 209
Still gas [3]	9, 988	9, 051	10, 438	10, 314	11, 374	11, 011	11, 273	11, 324	10, 929	10, 313	9, 392	10, 313	125, 720
Liquefied refinery gases	4, 791	4, 310	4, 544	4, 386	4, 622	4, 471	4, 456	4, 460	4, 101	4, 369	4, 091	4, 836	53, 437
Other miscellaneous [2]	1, 103	1, 254	1, 530	1, 144	1, 342	1, 289	1, 221	1, 474	1, 391	1, 380	1, 261	1, 427	15, 816
Other unfinished oils (net)	[4] 3, 941	[4] 1, 260	4, 259	1, 268	3, 026	[4] 592	530	206	[4] 1, 523	367	3, 058	[4] 4, 043	1, 355
Shortage or overage	(1, 465)	(1, 605)	(1, 175)	(510)	(689)	(872)	(368)	(1, 369)	(1, 695)	(1, 478)	(1, 898)	(2, 035)	(15, 159)
Total output	269, 187	237, 435	261, 741	244, 033	259, 918	247, 508	255, 826	264, 018	250, 799	250, 567	243, 997	255, 497	3, 040, 526

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[1] Includes unfinished gasoline (net).

[2] Production at natural-gasoline plants shown as direct "transfers" and omitted from the input and output at refineries.

[3] Conversion factors: 280 pounds of wax to the barrel; 5.0 barrels of coke to the short ton; 5.5 barrels of asphalt to the short ton; 3,600 cubic feet of still gas to the barrel.

[4] Negative quantity; represents net excess of unfinished oils rerun over unfinished oil produced.

[5] Preliminary figures.

TABLE 45.—Input and output of petroleum products at refineries in the United States, 1956–57, by districts

(Thousand barrels)

	East Coast	Appalachian	Indiana, Illinois, Kentucky, etc.	Minnesota, Wisconsin, etc.	Oklahoma, Kansas, etc.	Texas Inland	Texas Gulf Coast	Louisiana Gulf Coast	Arkansas-Louisiana Inland, etc.	New Mexico	Rocky Mountain	West Coast	Total
1956													
Input:													
Crude petroleum	412,173	74,263	514,406	31,453	250,778	99,419	716,417	254,700	34,245	8,742	98,196	410,314	2,905,106
Natural-gas liquids	2,369	105	15,294	229	14,008	24,572	36,411	12,107	602	756	1,841	26,768	135,062
Total input	414,542	74,368	529,700	31,682	264,786	123,991	752,828	266,807	34,847	9,498	100,037	437,082	3,040,168
Output:													
Gasoline [1]	167,980	33,664	264,164	15,210	138,475	71,775	335,447	128,253	12,903	4,583	46,513	177,820	1,396,787
Kerosine [2]	13,125	3,778	27,517	2,405	5,648	2,986	41,948	20,081	2,545	136	1,496	1,815	123,480
Distillate fuel oil [2]	110,069	15,497	104,954	8,057	61,667	18,816	185,161	66,197	7,986	1,609	22,936	62,738	665,687
Residual fuel oil	75,801	7,497	64,791	2,615	12,116	8,999	91,913	19,089	2,164	1,191	13,177	127,346	426,699
Jet fuel	2,917	1,764	5,077	388	10,943	4,472	13,491	6,867	414	954	2,772	16,384	66,443
Lubricating oil	8,911	4,897	5,193	----------	4,859	65	21,929	6,295	1,852	----------	199	5,011	59,211
Wax [3]	1,835	440	232	----------	523	43	1,074	672	----------	----------	77	471	5,367
Coke [3]	1,977	445	10,585	1,078	5,096	708	2,856	2,853	822	----------	1,294	3,381	31,095
Asphalt [3]	20,332	3,104	16,032	910	10,418	4,508	5,907	5,316	4,912	462	5,892	12,843	90,636
Road oil	131	48	1,899	----------	1,278	----------	9	1	1	----------	1,566	3,094	8,027
Still gas [3]	14,269	3,997	25,479	868	9,648	5,529	29,357	9,105	1,192	134	4,106	18,309	121,993
Liquefied refinery gases	5,207	269	4,070	633	3,882	2,503	16,010	11,509	313	87	571	6,908	51,962
Other miscellaneous [2]	2,025	219	1,514	29	853	363	2,282	1,600	88	----------	127	3,393	12,493
Other unfinished oils (net)	[4] 8,166	[4] 650	1,724	[4] 33	[4] 83	552	8,351	[4] 4,626	[4] 539	[4] 23	[4] 591	76	[4] 4,008
Shortage or overage	(1,871)	(601)	(3,531)	(478)	(537)	2,672	(2,907)	(6,405)	194	365	(98)	(2,507)	(15,704)
Total output	414,542	74,368	529,700	31,682	264,786	123,991	752,828	266,807	34,847	9,498	100,037	437,082	3,040,168
1957 [5]													
Input:													
Crude petroleum	435,760	71,473	505,830	34,723	256,932	98,643	688,208	236,849	33,257	9,681	99,797	419,283	2,890,436
Natural-gas liquids	2,279	8	14,372	239	13,939	25,359	42,150	22,320	581	882	2,159	25,802	150,090
Total input	438,039	71,481	520,202	34,962	270,871	124,002	730,358	259,169	33,838	10,563	101,956	445,085	3,040,526

Output:													
Gasoline [1]	179,897	33,348	258,128	16,482	143,899	73,900	333,193	127,061	12,719	5,081	47,647	183,980	1,415,335
Kerosine [2]	11,633	3,491	24,172	1,941	5,326	2,974	37,102	17,140	2,300	127	1,045	1,678	108,929
Distillate fuel oil [2]	118,145	14,098	105,975	9,198	61,607	18,278	180,525	64,658	7,651	1,899	23,269	63,270	668,573
Residual fuel oil	76,494	7,265	63,475	3,290	12,016	8,362	83,230	17,821	2,421	1,142	13,143	126,997	415,656
Jet fuel	1,851	1,038	5,124	424	10,860	5,145	13,398	4,008	570	984	3,343	16,577	63,322
Lubricating oil	8,210	4,408	4,453	----------	4,856	16	20,992	5,764	1,630	----------	173	5,221	55,723
Wax [3]	1,805	378	253	----------	567	34	1,211	695	----------	----------	55	463	5,461
Coke [3]	3,579	476	10,681	1,271	5,478	438	2,702	2,883	691	----------	1,494	3,773	33,463
Asphalt [3]	19,122	3,065	15,833	932	8,639	4,512	6,080	4,599	4,963	596	5,499	11,843	85,686
Road oil	40	56	1,676	83	1,277	4	23	2	13	----------	1,499	2,536	7,206
Still gas [3]	14,754	3,884	26,872	1,093	11,187	5,244	26,947	10,129	1,290	216	4,676	19,428	125,729
Liquefied refinery gases	6,621	367	4,481	717	4,569	2,655	16,031	10,536	419	73	522	6,446	53,430
Other miscellaneous [2]	2,583	194	1,713	50	949	487	3,439	2,121	62	4	198	4,016	15,817
Other unfinished oils (net)	[4] 4,941	43	[4] 558	125	454	[4] 188	7,142	[4] 1,888	[4] 540	31	[4] 3	1,678	1,355
Shortage or overage	(1,754)	(630)	(2,076)	(644)	(813)	2,141	(1,657)	(6,360)	(351)	410	(604)	(2,821)	(15,159)
Total output	438,039	71,481	520,202	34,962	270,871	124,002	730,358	259,169	33,838	10,563	101,956	445,085	3,040,526

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[1] Includes unfinished gasoline (net).

[2] Production at natural-gasoline plants shown as direct "transfers" and omitted from the input and output at refineries.

[3] Conversion factor: 280 pounds of wax to the barrel; 5.0 barrels of coke to the short ton; 5.5 barrels of asphalt to the short ton; 3,600 cubic feet of still gas to the barrel.

[4] Negative quantity; represents net excess of unfinished oils rerun over unfinished oils produced.

[5] Preliminary figures.

REFINERY CAPACITY

Total crude-oil capacity of petroleum refineries in the United States as of January 1, 1958, was 9,408,000 barrels daily—284,000 barrels more than on January 1, 1957. One new refinery in New Mexico and 1 in Washington began operating in 1957, and 2 new refineries were being built, 1 each in Texas and Washington. Approximately 95 percent of the total installed capacity was reported as operating on January 1, 1958.

TABLE 46.—Petroleum-refinery capacity in the United States, Jan. 1, 1953–58

	Number of refineries				Capacity (barrels per day)			
	Operating	Shut down	Total	Building	Operating	Shut down	Total	Building
1953	315	28	343	4	7,481,701	[1] 156,960	7,638,661	509,721
1954	308	29	337	7	7,782,103	[1] 224,794	8,006,897	397,500
1955	296	30	326	4	8,069,154	[1] 351,476	8,420,630	146,800
1956	294	24	318	2	8,380,801	[1] 251,589	8,632,390	267,000
1957	298	21	319	3	8,808,841	[1] 314,833	9,123,674	256,350
1958	289	29	318	2	8,939,907	[1] 467,800	9,407,707	185,265

[1] Includes 18,941 in 1953, 22,920 in 1954, 34,586 in 1955, 49,754 in 1956, 51,977 in 1957, and 49,400 in 1958 reported as inoperative without reconditioning.

AVIATION GASOLINE

The demand for aviation gasoline declined 1.7 percent in 1957. Exports were 573,000 barrels less than in 1956, and domestic demand was 1,649,000 barrels below 1956. Military deliveries declined 16.5 percent, whereas civilian use increased 15.0 percent. The demand for 115–145 octane gasoline was 3 percent higher in 1957 than in 1956.

Jet fuels are not included in aviation gasoline. They are reported as a separate product in another section of this chapter.

TABLE 47.—Salient statistics of aviation gasoline in the United States 1956, by months

(Thousand barrels)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Production, by grades:													
115-145 octane	3,157	3,346	3,674	3,792	3,986	3,800	3,927	4,176	4,018	4,273	3,787	4,568	46,504
108-135 octane	301	327	335	289	326	273	450	460	338	289	246	145	3,779
100-130 octane	3,166	2,572	3,047	3,374	2,811	3,078	2,913	3,148	2,907	3,068	3,236	2,627	35,947
91-98 octane	488	488	530	546	553	521	541	412	430	585	434	420	5,948
Other grades	208	133	227	267	314	318	538	461	278	299	265	186	3,494
Alkylate	1,556	1,151	1,066	936	1,377	1,546	1,166	1,180	1,364	899	1,250	1,650	15,141
Transfers out [1]	978	954	974	1,171	955	1,089	1,137	1,215	1,087	1,061	1,274	1,111	13,006
Exports	1,802	899	1,747	1,590	1,632	1,468	1,968	1,648	2,182	1,810	1,859	1,704	20,309
Stocks, bygrades:													
115-145 octane	2,812	3,447	3,345	3,600	3,488	3,317	3,445	3,445	3,344	3,269	3,569	3,756	3,756
108-135 octane	258	398	318	403	393	354	389	382	289	376	306	255	255
100-130 octane	3,369	3,459	3,522	3,703	3,466	3,597	3,405	3,271	3,247	3,365	3,487	3,428	3,428
91-98 octane	705	728	711	739	719	706	719	673	645	746	721	767	767
Other grades	471	458	429	420	442	388	489	465	390	409	432	457	457
Alkylate	2,793	3,006	3,113	2,934	3,073	3,597	3,639	3,673	3,766	3,460	3,266	3,772	3,772
Domestic demand, all grades	5,228	5,076	6,216	6,082	6,998	6,601	6,303	7,141	6,304	6,598	5,929	6,127	74,603
Total demand,[2] by grades:													
115-145 octane	2,962	2,708	3,758	3,452	4,002	3,966	3,782	4,201	4,141	4,336	3,480	4,366	45,154
108-135 octane	328	187	415	204	335	312	415	466	461	202	316	196	3,837
100-130 octane	2,907	2,480	2,983	3,193	3,034	2,930	3,091	3,268	2,989	2,985	3,206	2,756	35,822
91-98 octane	375	323	480	458	489	458	513	375	423	452	426	271	5,043
Other grades	207	140	253	268	285	354	435	478	336	257	236	160	3,409
Alkylate	251	137	74	97	485	49	35	1	136	176	124	82	1,647
Production, by districts:													
District 1	552	583	384	499	514	794	601	564	485	381	389	460	6,206
District 2	1,225	1,130	1,309	1,034	1,222	1,363	1,335	1,389	1,287	1,091	1,272	1,294	14,951
District 3	5,344	4,744	5,184	5,758	5,553	5,350	5,491	5,779	5,627	5,944	5,615	5,824	66,213
District 4	185	176	180	160	140	192	199	192	197	231	193	170	2,215
District 5	1,570	1,384	1,822	1,753	1,938	1,837	1,909	1,913	1,739	1,766	1,749	1,848	21,228
Total	8,876	8,017	8,879	9,204	9,367	9,536	9,535	9,837	9,335	9,413	9,218	9,596	110,813
Exports, by districts:													
District 1	----------	----------	70	3	3	----------	----------	----------	53	----------	----------	7	136
District 2	26	30	69	82	59	117	64	95	67	63	83	59	814
District 3	1,421	685	1,349	1,237	1,203	1,092	1,393	1,241	1,609	1,510	1,562	1,495	15,797
District 4	2	1	----------	1	2	4	4	2	3	2	3	1	25
District 5	353	183	259	267	365	255	507	310	450	235	211	142	3,537
Total	1,802	899	1,747	1,590	1,632	1,468	1,968	1,648	2,182	1,810	1,859	1,704	20,309

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[1] Reject material used as automotive gasoline.
[2] Includes exports.

TABLE. 47.—Salient statistics of gasoline in the United States 1956, by months—Continued

(Thousand barrels)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Stocks, by districts:													
District 1	830	980	802	752	900	1, 362	1, 506	1, 492	1, 405	1, 271	1, 091	1, 186	1, 186
District 2	2, 256	2, 614	2, 669	2, 427	2, 459	2, 508	2, 578	2, 813	2, 782	2, 511	2, 449	2, 646	2, 646
District 3	4, 986	5, 398	5, 351	5, 910	5, 768	5, 708	5, 679	5, 514	5, 399	5, 506	5, 901	6, 215	6, 215
District 4	146	177	186	196	178	184	164	130	134	134	119	146	146
District 5	2, 190	2, 327	2, 430	2, 514	2, 276	2, 197	2, 159	1, 970	1, 961	2, 203	2, 221	2, 242	2, 242
Total	10, 408	11, 496	11, 438	11, 799	11, 581	11, 959	12, 086	11, 919	11, 681	11, 625	11, 781	12, 435	12, 435
Total demand by districts:[2]													
District 1	422	355	474	447	333	271	420	496	526	413	466	355	4, 978
District 2	835	525	1, 043	887	1, 087	1, 036	966	895	1, 000	1, 099	966	711	11, 050
District 3	4, 552	3, 859	4, 785	4, 815	5, 173	4, 952	5, 056	5, 363	5, 296	5, 411	4, 833	5, 074	59, 169
District 4	158	118	145	138	128	145	181	195	181	195	200	120	1, 904
District 5	1, 063	1, 118	1, 516	1, 385	1, 909	1, 665	1, 648	1, 840	1, 483	1, 290	1, 323	1, 571	17, 811
Total	7, 030	5, 975	7, 963	7, 672	8, 630	8, 069	8, 271	8, 789	8, 486	8, 408	7, 788	7, 831	94, 912

[2] Includes exports.

TABLE 48.—Salient statistics of aviation gasoline in the United States, 1956 (total) and 1957, by months

(Thousand barrels)

	1957 [1]													1956 total
	January	February	March	April	May	June	July	August	September	October	November	December	Total	
Production, by grades:														
115–145 octane	4, 541	3, 627	4, 649	3, 911	3, 825	4, 022	4, 367	4, 407	3, 156	4, 019	3, 071	3, 668	47, 263	46, 504
108–135 octane	348	182	316	150	509	133	276	341	339	276	165	367	3, 402	3, 779
100–130 octane	2, 899	2, 490	3, 034	2, 932	2, 955	3, 033	3, 039	3, 086	2, 831	3, 200	2, 729	2, 745	34, 973	35, 947
91–98 octane	445	349	369	467	515	438	362	443	320	330	474	319	4, 831	5, 948
Other grades	166	160	284	216	433	348	384	467	441	219	230	211	3, 559	3, 494
Alkylate	1, 014	1, 435	959	1, 148	1, 336	1, 487	1, 434	1, 432	2, 121	1, 498	2, 316	2, 118	18, 298	15, 141
Transfers out [2]	840	1, 108	1, 327	1, 030	1, 258	1, 317	1, 375	1, 520	1, 843	1, 656	1, 621	1, 735	16, 630	13, 006
Exports	950	1, 396	1, 672	1, 200	1, 490	2, 070	1, 624	1, 957	2, 138	1. 677	2, 333	1, 223	19, 730	20, 309
Stocks, by grades:														
115–145 octane	3, 756	3, 689	4, 005	3, 714	3, 831	4, 226	4, 110	4, 100	3, 998	4, 326	4, 102	4, 321	4, 321	3, 756
108–135 octane	306	260	326	287	475	332	334	394	338	285	195	323	323	255
100–130 octane	3, 634	3, 489	3, 251	3, 284	3, 415	3, 315	3, 272	3, 321	3, 549	3, 886	3, 626	3, 877	3, 877	3, 428
91–98 octane	775	765	668	685	771	666	631	721	661	638	769	788	788	767
Other grades	442	444	436	365	453	425	403	410	505	444	467	443	443	457
Alkylate	3, 902	4, 271	3, 929	4, 062	4, 065	4, 121	4, 139	4, 066	4, 281	4, 130	4, 766	5, 116	5, 116	3, 772
Domestic demand, all grades	7, 243	5, 636	6, 915	6, 812	6, 212	5, 999	7, 059	6, 576	4, 907	5, 832	4, 815	5, 527	73, 533	74, 603

Total demand,[3] by grades:														
115–145 octane	4, 559	3, 684	4, 336	4, 199	3, 702	3, 618	4, 456	4, 321	3, 214	3, 680	3, 243	3, 428	46, 440	45, 154
108–135 octane	296	195	250	189	321	275	274	281	394	327	252	238	3, 292	3, 837
100–130 octane	2, 631	2, 621	3, 242	2, 898	2, 822	3, 096	3, 074	3, 112	2, 598	2, 854	2, 982	2, 488	34, 418	35, 822
91–98 octane	397	311	440	397	409	478	376	350	370	351	338	299	4, 516	5, 043
Other grades	178	151	277	287	332	374	399	459	342	277	207	231	3, 514	3, 409
Alkylate	132	70	42	42	116	228	104	10	127	20	126	66	1, 083	1, 647
Production, by districts:														
District 1	541	553	666	558	616	668	707	805	529	473	504	534	7, 154	6, 206
District 2	1, 361	1, 047	1, 237	1, 113	1, 283	1, 213	1, 253	1, 608	1, 488	1, 615	1, 507	1, 595	16, 320	14, 951
District 3	5, 482	4, 826	5, 698	5, 296	5, 867	5, 968	6, 066	5, 729	5, 416	5, 778	5, 158	5, 463	66, 747	66, 213
District 4	162	60	116	78	91	122	116	272	124	91	127	113	1, 472	2, 215
District 5	1, 867	1, 757	1, 894	1, 779	1, 716	1, 490	1, 720	1, 762	1, 651	1, 585	1, 689	1, 723	20, 633	21, 228
Total	9, 413	8, 243	9, 611	8, 824	9, 573	9, 461	9, 862	10, 176	9, 208	9, 542	8, 985	9, 428	112, 326	110, 813
Exports, by districts:														
District 1	--------	2	3	2	1	3	--------	70	31	--------	--------	6	118	136
District 2	9	32	71	47	114	59	42	52	48	81	60	52	667	814
District 3	619	1, 012	1, 301	1, 027	1, 099	1, 744	1, 294	1, 484	1, 682	1, 109	1, 954	913	15, 238	15, 797
District 4	--------	1	1	1	2	2	2	2	2	2	2	2	19	25
District 5	322	349	296	123	274	262	286	349	375	485	317	250	3, 688	3, 537
Total	950	1, 396	1, 672	1, 200	1, 490	2, 070	1, 624	1, 957	2, 138	1, 677	2, 333	1, 223	19, 730	20, 309
Stocks, by districts:														
District 1	1, 344	1, 374	1, 394	1, 358	1, 116	1, 043	1, 044	1, 273	1, 217	1, 394	1, 606	1, 464	1, 464	1, 186
District 2	2, 883	2, 737	2, 756	2, 581	2, 555	2, 576	2, 362	2, 547	2, 649	2, 711	2, 890	3, 184	3, 184	2, 646
District 3	5, 958	6, 064	5, 784	5, 761	6, 539	6, 733	6, 880	6, 481	6, 584	6, 757	6, 376	6, 858	6, 858	6, 215
District 4	161	126	134	114	111	128	109	94	141	135	160	165	165	146
District 5	2, 469	2, 617	2, 547	2, 583	2, 689	2, 605	2, 494	2, 617	2, 741	2, 712	2, 893	3, 197	3, 197	2, 242
Total	12, 815	12, 918	12, 615	12, 397	13, 010	13, 085	12, 889	13, 012	13, 332	13, 709	13, 925	14, 868	14, 868	12, 435
Total demand,[3] by grades:														
District 1	357	366	533	503	765	618	533	422	452	177	221	506	5, 453	4, 978
District 2	868	940	1, 039	973	969	848	1, 163	1, 036	799	997	778	748	11, 158	11, 050
District 3	5, 302	4, 217	5, 307	4, 833	4, 486	5, 108	5, 185	5, 381	4, 496	4, 831	4, 826	4, 355	58, 327	59, 169
District 4	139	85	96	86	94	98	126	278	59	65	69	64	1, 259	1, 904
District 5	1, 527	1, 424	1, 612	1, 617	1, 388	1, 397	1, 676	1, 416	1, 239	1, 439	1, 254	1, 077	17, 066	17, 811
Total	8, 193	7, 032	8, 587	8, 012	7, 702	8, 069	8, 683	8, 533	7, 045	7, 509	7, 148	6, 750	93, 263	94, 912

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[1] Preliminary figures.
[2] Reject material used as automotive gasoline.
[3] Includes exports.

GASOLINE

The total demand for gasoline in 1957 continued to increase, but the increase (1.6 percent) was the smallest since 1946. Domestic demand averaged 3,817,000 barrels daily, and exports averaged 106,000 barrels daily.

All figures for aviation gasoline and naphtha are included under total gasoline.

TABLE 49.—Salient statistics of gasoline in the United States, 1955 (total) and 1956, by months

(Thousand barrels)

	1956						
	January	February	March	April	May	June	July
Production:							
Finished gasoline and naphtha from crude oil	106, 593	98, 608	105, 339	97, 609	104, 671	106, 047	109, 642
Unfinished gasoline (net)	1, 654	498	179	−982	1, 444	71	−304
Natural-gas liquids used at refineries	10, 883	9, 507	10, 240	10, 092	10, 323	10, 273	10, 863
Sold to jobbers	2, 677	3, 203	3, 008	2, 700	3, 257	2, 925	3, 076
Total production	121, 807	111, 816	118, 766	109, 419	119, 695	119, 316	123, 277
Daily average	3, 929	3, 855	3, 831	3, 647	3, 861	3, 977	3, 976
Imports	11	111	84	4	139	439	338
Exports	2, 784	1, 617	2, 861	2, 759	2, 638	2, 635	3, 291
Daily average	89	56	92	91	85	87	106
Stocks, end of period:							
Finished gasoline	172, 865	184, 554	187, 981	182, 564	174, 494	164, 826	164, 590
Unfinished gasoline	11, 040	11, 538	11, 717	10, 735	12, 179	12, 250	11, 946
Total stocks	183, 905	196, 092	199, 698	193, 299	186, 673	177, 076	176, 536
Domestic demand	100, 562	98, 123	112, 383	113, 063	123, 822	126, 717	120, 864
Daily average	3, 244	3, 384	3, 625	3, 769	3, 994	4, 223	3, 898

	1956						1955 total
	August	September	October	November	December	Total	
Production:							
Finished gasoline and naphtha from crude oil	110, 623	106, 531	101, 531	102, 403	108, 897	1, 258, 494	1, 204, 481
Unfinished gasoline (net)	−149	−855	548	232	895	3, 231	665
Natural-gas liquids used at refineries	11, 118	11, 399	13, 455	13, 145	13, 764	135, 062	126, 382
Sold to jobbers	3, 592	2, 718	1, 474	1, 680	1, 710	32, 020	42, 422
Total production	125, 184	119, 793	117, 008	117, 460	125, 266	1, 428, 807	1, 373, 950
Daily average	4, 038	3, 993	3, 774	3, 915	4, 040	3, 903	3, 764
Imports	187	76	235	31	27	1, 682	4, 809
Exports	2, 898	3, 251	2, 833	3, 294	4, 711	35, 572	34, 521
Daily average	93	108	91	109	151	97	94
Stocks, end of period:							
Finished gasoline	161, 142	167, 032	161, 308	163, 086	174, 654	174, 654	156, 047
Unfinished gasoline	11, 797	10, 942	11, 490	11, 722	12, 617	12, 617	9, 386
Total stocks	172, 939	177, 974	172, 798	174, 808	187, 271	187, 271	165, 433
Domestic demand	126, 070	111, 583	119, 586	112, 187	108, 119	1, 373, 079	1, 334, 205
Daily average	4, 066	3, 719	3, 857	3, 739	3, 488	3, 751	3, 654

TABLE 50.—Salient statistics of gasoline in the United States, 1956 (total) and 1957,[1] by months

(Thousand barrels)

	1957						
	January	February	March	April	May	June	July
Production:							
Finished gasoline and naphtha from crude oil	109,269	95,032	103,407	99,193	107,358	104,894	107,245
Unfinished gasoline (net)	143	82	334	−418	−728	36	−852
Natural-gas liquids used at refineries	12,702	10,974	12,296	11,836	12,158	11,506	12,414
Sold to jobbers	1,564	2,117	2,554	2,487	2,104	3,085	1,699
Total production	123,678	108,205	118,591	113,098	120,892	119,521	120,506
Daily average	3,989	3,864	3,825	3,769	3,899	3,984	3,887
Imports	161	84	141	251	6	136	141
Exports	4,113	4,027	4,120	2,838	2,886	3,090	2,591
Daily average	132	143	132	94	93	103	83
Stocks, end of period:							
Finished gasoline	184,942	192,428	193,540	188,649	183,064	177,997	166,654
Unfinished gasoline	12,760	12,842	13,176	12,758	12,030	12,066	11,214
Total stocks	197,702	205,270	206,716	201,407	195,094	190,063	177,868
Domestic demand	109,295	96,694	113,166	115,820	124,325	121,598	130,251
Daily average	3,526	3,453	3,651	3,861	4,011	4,053	4,202

	1957						1956 total
	August	September	October	November	December	Total	
Production							
Finished gasoline and naphtha from crude oil	112,109	109,264	107,041	102,323	110,204	1,267,339	1,258,49
Unfinished gasoline (net)	7	−589	282	376	−767	−2,094	3,23
Natural-gas liquids used at refineries	13,171	13,193	13,424	13,224	13,192	150,090	135,06
Sold to jobbers	2,507	1,092	1,356	1,103	1,405	23,073	32,02
Total production	127,794	122,960	122,103	117,026	124,034	1,438,408	1,428,80
Daily average	4,122	4,098	3,938	3,900	4,001	3,940	3,90
Imports	483	585	254	282	381	2,905	1,68
Exports	3,306	3,321	2,809	3,364	2,089	38,554	35,57
Daily average	106	110	90	112	67	105	94
Stocks, end of period:							
Finished gasoline	162,810	170,056	169,988	175,851	186,253	186,253	174,654
Unfinished gasoline	11,221	10,632	10,914	11,290	10,523	10,523	12,617
Total stocks	174,031	180,688	180,902	187,141	196,776	196,776	187,271
Domestic demand	128,808	113,567	119,334	107,705	112,691	1,393,254	1,373,07
Daily average	4,155	3,786	3,850	3,590	3,635	3,817	3,751

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[1] Preliminary figures.

Production.—Total production of gasoline in 1957 was 1,438.4 million barrels—1,265.3 million barrels from crude oil and 173.1 million barrels from natural-gas liquids blended at refineries and outside of refineries.

Yields.—The yield of gasoline from crude oil was maintained at a low percentage during the first half of 1957. Refiners had ample stocks of gasoline on hand, and the heavy demand for distillate and residual fuel oils for export required higher percentage yields of these products. In September the yield of gasoline rose to 45.4 percent, and it remained high for the balance of the year.

TABLE 51.—Production of gasoline in the United States in 1957, by districts and months

(Thousand barrels)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Gasoline from crude oil (excludes net unfinished):													
East Coast	15, 157	13, 127	15, 256	14, 404	14, 686	14, 404	15. 054	16, 199	15, 411	15, 130	12, 992	15, 218	177, 038
Appalachian	2, 794	2, 545	2, 812	2, 603	2, 651	2. 255	2, 186	2, 476	2, 901	3, 038	2, 838	2, 957	32, 056
Indiana, Illinois, Kentucky, etc	21, 237	18, 545	20, 148	18, 870	20, 120	19, 253	19, 371	19, 740	20, 458	20, 911	21, 326	21, 196	241, 175
Minnesota, Wisconsin, etc	1, 468	1, 403	1, 485	1, 225	1, 482	1, 413	1, 488	1, 510	725	1, 186	1, 250	1, 596	16, 231
Oklahoma, Kansas, etc	11, 020	9, 317	10, 422	9, 636	10, 751	11, 078	11, 306	11. 685	11, 055	10, 757	9, 997	11, 646	128, 670
Texas Inland	3, 829	3, 511	3, 967	3, 325	3, 749	3, 813	4, 036	3, 964	4, 166	3, 884	3, 606	3, 957	45, 807
Texas Gulf Coast	24, 056	21, 149	22, 462	22, 201	24, 929	23, 708	24, 164	25, 943	25, 006	24, 089	21, 199	23, 992	282, 898
Louisiana Gulf Coast	8, 757	7, 247	7. 413	8, 074	8, 682	9, 431	9, 262	9, 415	8, 930	8, 837	8, 352	8, 645	103, 045
Arkansas, Louisiana Inland, etc	1, 160	960	1, 023	667	774	908	974	892	1, 058	981	1, 056	1, 094	11, 547
New Mexico	358	332	352	390	296	334	322	375	313	379	370	306	4, 127
Rocky Mountain	4, 034	3, 449	3, 737	3, 148	3, 700	3, 930	4, 020	4, 224	3, 907	3, 704	3, 783	3, 756	45, 392
West Coast	13, 333	11, 793	12, 425	12, 627	13, 588	12, 225	13, 002	13, 687	13, 431	11, 995	13, 589	13, 878	155, 573
Total gasoline	107, 203	93, 378	101, 502	97, 170	105, 408	102, 752	105, 185	110, 110	107. 361	104, 891	100, 358	108, 241	1, 243, 559
Naphtha:													
East Coast	142	116	133	187	129	235	172	185	138	155	156	149	1, 897
Appalachian	42	49	51	72	25	128	47	24	49	26	42	36	591
Indiana, Illinois, Kentucky, etc	311	271	336	307	334	301	361	318	293	371	291	329	3, 823
Minnesota, Wisconsin, etc	------	------	------	------	------	------	------	4	3	------	------	------	7
Oklahoma, Kansas, etc	56	67	67	41	123	64	115	99	123	100	113	94	1, 062
Texas Inland	64	53	39	54	62	35	92	21	54	101	82	42	699
Texas Gulf Coast	987	740	847	893	794	843	772	852	765	762	743	789	9, 787
Louisiana Gulf Coast	204	196	172	186	125	230	229	200	201	337	190	219	2, 489
Arkansas, Louisiana Inland, etc	43	16	19	43	45	58	56	63	41	67	76	64	591
New Mexico	3	3	2	2	3	3	12	11	5	5	5	18	72
Rocky Mountain	7	3	18	11	5	19	47	12	1	7	20	7	157
West Coast	207	140	221	227	305	226	157	210	230	219	247	216	2, 605
Total naphtha	2, 066	1, 654	1, 905	2, 023	1, 950	2, 142	2, 060	1, 999	1, 903	2, 150	1, 965	1, 963	23, 780
Total gasoline and naphtha from crude	109, 269	95, 032	103, 407	99, 193	107, 358	104, 894	107, 245	112, 109	109, 264	107, 041	102, 323	110, 204	1, 267, 339

Unfinished gasoline (net):													
East Coast	113	-81	22	-201	-21	157	-401	-181	-276	-370	-30	-48	-1, 317
Appalachian	75	96	58	68	60	-15	3	33	68	86	65	96	693
Indiana, Illinois, Kentucky, etc	38	15	-219	-226	-115	12	-165	115	-158	-246	-135	-158	-1, 242
Minnesota, Wisconsin, etc	1	-2	3	----------	-1	-1	-1	----------	2	-1	1	4	5
Oklahoma, Kansas, etc	12	236	-137	-83	157	-38	-71	-48	----------	113	283	-196	228
Texas Inland	261	87	114	283	216	193	143	280	56	157	14	231	2, 035
Texas Gulf Coast	-47	-405	68	-220	-996	163	-394	-86	37	115	475	-352	-1, 642
Louisiana Gulf Coast	-194	-2	-69	-47	23	-142	-117	-101	-73	31	-65	-37	-793
Arkansas, Louisiana Inland, etc	----------	----------	1	-1	----------	----------	1	-1	----------	----------	----------	----------	----------
New Mexico	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Rocky Mountain	-24	128	1	-11	-102	43	-33	11	-92	57	-7	-32	-61
West Coast	-92	10	492	20	51	-336	183	-15	-153	340	-225	-275	----------
Total unfinished gasoline (net)	143	82	334	-418	-728	36	-852	7	-589	282	376	-767	-2, 094
Percent yield of gasoline and naphtha [1]	42. 0	41. 8	42. 3	42. 8	43. 6	44. 4	43. 8	44. 7	45. 4	45. 3	45. 1	44. 4	43. 8
Natural-gas liquids blended at refineries	12, 702	10, 974	12, 296	11, 836	12, 158	11, 506	12, 414	13, 171	13, 193	13, 424	13, 224	13, 192	150, 090
Total refinery production:													
East Coast	15, 675	13, 417	15, 636	14, 514	14, 918	14, 939	14, 983	16, 459	15, 413	15, 103	13, 342	15, 498	179, 897
Appalachian	2, 912	2, 691	2, 922	2, 743	2, 736	2, 368	2, 236	2, 533	3, 018	3, 150	2, 945	3, 094	33, 348
Indiana, Illinois, Kentucky, etc	22, 961	19, 770	21, 230	20, 024	21, 347	20, 540	20, 550	21, 542	21, 884	22, 645	22, 877	22, 758	258, 128
Minnesota, Wisconsin, etc	1, 486	1, 415	1, 506	1, 236	1, 501	1, 430	1, 509	1, 553	753	1, 206	1, 266	1, 621	16, 482
Oklahoma, Kansas, etc	12, 266	10, 637	11, 429	10, 609	11, 957	12, 073	12, 556	12, 988	12, 416	12, 304	11, 792	12, 872	143, 899
Texas Inland	6, 139	5, 223	6, 419	5, 717	6, 166	6, 143	6, 582	6, 529	6, 477	6, 396	5, 688	6, 421	73, 900
Texas Gulf Coast	28, 353	24, 636	26, 713	26, 146	28, 035	27, 979	28, 026	30, 705	29, 559	28, 654	26, 295	28, 092	333, 193
Louisiana Gulf Coast	10, 742	9, 227	9, 355	9, 981	10, 958	11, 086	11, 194	11, 107	11, 046	11, 019	10, 457	10, 889	127, 061
Arkansas, Louisiana Inland, etc	1, 273	1, 039	1, 087	750	856	1, 011	1, 076	1, 000	1, 141	1, 101	1, 178	1, 207	12, 719
New Mexico	432	401	433	457	370	402	425	462	416	476	438	369	5, 081
Rocky Mountain	4, 252	3, 784	3, 925	3, 379	3, 745	4, 123	4, 156	4, 380	3, 993	3, 974	4, 013	3, 923	47, 647
West Coast	15, 623	13, 848	15, 382	15, 055	16, 199	14, 342	15, 514	16, 029	15, 752	14, 719	15, 632	15, 885	183, 980
Total 1957	122, 114	106, 088	116, 037	110, 611	118, 788	116, 436	118, 807	125, 287	121, 868	120, 747	115, 923	122, 629	1, 415, 335
Natural-gas liquids used in other gasoline blends [2]	1, 564	2, 117	2, 554	2, 487	2, 104	3, 085	1, 699	2, 507	1, 092	1, 356	1, 103	1, 405	23, 073
Total gasoline production	123, 678	108, 205	118, 591	113, 098	120, 892	119, 521	120, 506	127, 794	122, 960	122, 103	117, 026	124, 034	1, 438, 408

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[1] Based on crude runs to stills adjusted for net stocks of unfinished oils.

[2] This represents a net figure and includes exports.

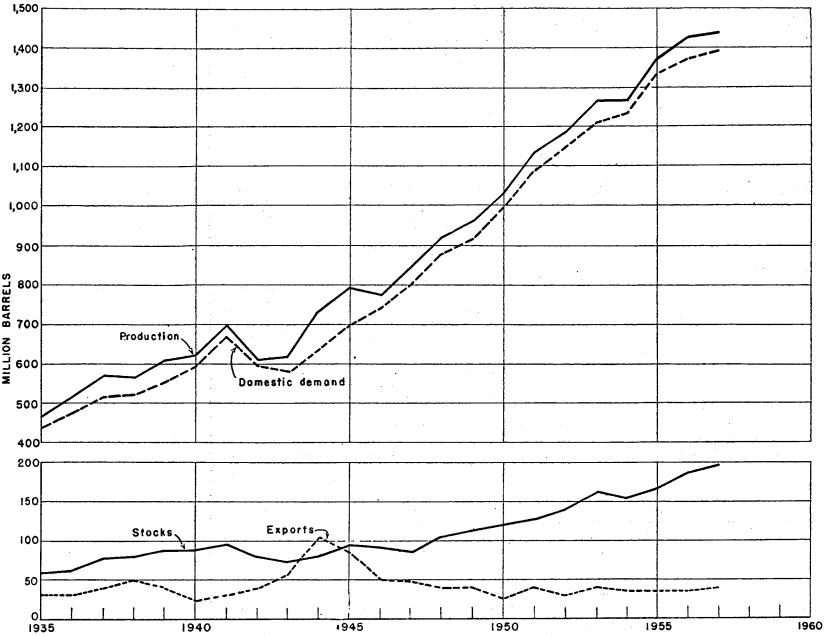

FIGURE 7.—Production, domestic demand, exports, and stocks of gasoline in the United States, 1935–57.

Domestic Demand.—Domestic demand for gasoline and naphtha increased 1.5 percent in 1957. Civilian highway use of gasoline, as computed from data compiled by the Bureau of Public Roads, increased 2.8 percent to 1,195.0 million barrels and accounted for 85.8 percent of the total domestic demand for gasoline and naphtha.

No complete breakdown is available for nonhighway uses of gasoline, which in 1957 totaled 101.2 million barrels, a decline of 13.2 million barrels from 1956. Demand for aviation gasoline, included in this total, declined from 74.6 million to 73.5 million barrels. The major decline was in the unreported category, which includes nonhighway motor vehicles, military motor vehicles, stationary engines, marine engines, and losses.

Production and Consumption by States.—Table 52, which shows gasoline production and consumption by States, indicates the areas of surplus production and deficit supply. Refinery-production data compiled by the Bureau of Mines do not include natural-gas liquids blended outside of refineries. Consumption data, by States, compiled by the American Petroleum Institute, exclude commercial naphthas and offshore military shipments. These omissions roughly offset each other.

District 1 (Atlantic Coast States and West Virginia) produced 195 million barrels of gasoline and consumed 468 million barrels in 1957. District 3 supplied most of the deficit in District 1, shipping to that area 225 million barrels by water, 45 million by pipline, and approximately 2 million by rail. District 1 shipped about 6 million barrels of gasoline to District 2 by pipeline and rail but received a like amount from that district by lake, barge, and rail.

District 2 (refinery districts Appalachian 2 in eastern Ohio, Indiana-Illinois, Minnesota-Wisconsin, and Oklahoma-Kansas) produced 436 million barrels of gasoline and consumed 492 million. The deficit was offset by receipts of gasoline by pipeline, barge, and rail, principally from District 3.

District 3 (Texas, Louisiana, Arkansas, Mississippi, Alabama, and New Mexico) is a surplus gasoline-producing area. Output exceeded consumption by 366 million barrels, and the surplus was used to supply other refining districts in the Nation and for export.

District 4 (States in the Rocky Mountain region excluding New Mexico) produced 48 million and consumed 40 million barrels of gasoline. Net pipeline shipments from the district were 3 million barrels; the balance of the surplus was shipped from the district by rail and truck.

District 5 (States on the west coast, Arizona, and Nevada) produced 184 million barrels, consumed 181 million, and exported 10 million barrels. Total receipts from other districts were 14 million barrels—11 million barrels by pipeline from Districts 3 and 4 and the balance by rail and truck. District 5 shipped about 1 million barrels to other districts by rail and truck.

Method of Distribution.—Product pipelines are the principal method used to deliver gasoline; in turn, gasoline composes 72 percent of the volume of product pipeline shipments. In 1957, pipelines delivered 645 million barrels of gasoline, of which 115 million barrels moved beyond the originating district to other Petroleum Administration for War (PAW) districts. Waterborne shipments of gasoline from the Gulf Coast district to other PAW districts totaled 285 million barrels. Shipments to the east coast accounted for 225 million barrels, waterway shipments on the Mississippi and Ohio River for 59 million barrels, and shipments to the west coast for 1 million barrels. Intradistrict waterborne shipments of gasoline also are considerable.

TABLE 52.—Production (refinery output) and consumption of gasoline in the United States, 1955–57, by States

(Thousand barrels)

	1955		1956		1957[1]	
	Production[2]	Consumption[3]	Production[2]	Consumption[3]	Production[2]	Consumption[3]
Alabama	(4)	19,668	(4)	21,115	(4)	21,696
Arizona	----------	8,564	----------	9,295	----------	9,996
Arkansas	10,843	12,320	11,251	13,154	11,399	13,039
California	[5] 174,417	133,713	[5] 177,820	126,991	[5] 183,980	130,041
Colorado	5,014	14,177	5,283	15,194	5,303	15,782
Connecticut	----------	16,021	----------	16,513	----------	17,277
Delaware	(6)	3,426	(5)	3,703	(6)	4,391
District of Columbia	----------	4,929	----------	4,863	----------	4,715
Florida	5	32,693	26	36,516	----------	39,860
Georgia	[7] 6,984	26,291	[7] 9,597	27,842	[7] 10,922	28,452
Idaho	----------	5,949	----------	6,082	----------	6,192
Illinois	[8] 109,183	64,753	105,065	67,005	99,437	69,283
Indiana	67,556	39,076	65,997	40,898	68,463	40,951
Iowa	----------	26,372	----------	26,632	----------	26,831
Kansas	[9] 69,085	24,474	52,408	24,752	56,511	24,642
Kentucky	[10] 11,049	18,544	[10] 12,673	19,470	[10] 14,877	20,583
Louisiana	[4] 122,245	19,961	[4] 129,905	20,872	[4] 128,381	21,651
Maine	----------	6,966	----------	7,133	----------	7,465
Maryland	(7)	18,300	(7)	19,525	(7)	19,886
Massachusetts	[6] 5,312	28,892	[6] 7,163	30,141	[6] 21,086	31,569
Michigan	17,894	58,251	19,502	59,179	19,525	61,069
Minnesota	(8)	27,436	[11] 7,399	28,625	[11] 8,423	29,517
Mississippi	(4)	13,806	(4)	14,525	(4)	14,391
Missouri	(9)	36,767	[12] 12,255	38,140	[12] 12,967	38,176
Montana	8,967	6,580	9,621	6,929	9,856	6,906
Nebraska	(9)	13,530	(12)	13,548	(12)	13,844
Nevada	----------	2,973	----------	3,074	----------	3,221
New Hampshire	----------	4,100	----------	4,396	----------	4,692
New Jersey	52,808	43,010	54,286	43,955	54,220	43,830
New Mexico	4,090	8,008	4,583	8,919	5,081	9,642
New York	14,444	83,714	14,668	88,334	15,220	93,428
North Carolina	----------	29,861	----------	31,235	----------	31,817
North Dakota	(9)	7,200	[13] 7,811	7,250	[13] 8,059	7,482
Ohio	75,377	69,378	79,866	73,109	73,645	74,502
Oklahoma	72,178	21,916	73,812	22,469	74,421	22,372
Oregon	----------	14,769	----------	15,267	----------	15,086
Pennsylvania	93,581	67,774	95,984	71,172	93,139	74,133
Rhode Island	(6)	5,558	(6)	5,591	(6)	5,769
South Carolina	(7)	14,936	(7)	15,813	(7)	16,039
South Dakota	----------	7,830	----------	7,777	----------	7,983
Tennessee	(10)	23,233	(10)	24,690	(10)	25,353
Texas	380,474	105,672	407,222	107,045	407,093	105,079
Utah	13,115	7,000	15,085	7,210	15,678	7,444
Vermont	----------	2,833	----------	2,898	----------	2,947
Virginia	----------	26,842	(7)	28,545	(7)	29,524
Washington	(5)	20,690	(5)	22,176	(5)	22,714
West Virginia	841	10,985	981	11,491	839	11,901
Wisconsin	(8)	28,292	(13)	28,909	(13)	29,604
Wyoming	16,066	3,862	16,524	3,900	16,810	3,983
Total	1,331,528	1,291,895	1,396,787	[14] 1,333,867	1,415,335	1,366,750

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[1] Preliminary figures.
[2] Excludes jet fuel.
[3] American Petroleum Institute.
[4] Alabama and Mississippi included with Louisiana.
[5] Washington included with California.
[6] Delaware and Rhode Island included with Massachusetts.
[7] Maryland, South Carolina, and Virginia included with Georgia.
[8] Minnesota and Wisconsin included with Illinois.
[9] Missouri, Nebraska, and North Dakota included with Kansas.
[10] Tennessee included with Kentucky.
[11] Minnesota formerly included with Illinois.
[12] Missouri formerly included with Kansas and now included with Nebraska.
[13] North Dakota formerly included with Kansas and now included with Wisconsin
[14] Revised.

TABLE 53.—Transportation of petroleum products by pipeline in 1956–57, by months

(Thousand barrels)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1956													
Turned into lines:[1]													
Gasoline	45,839	44,731	49,848	50,096	54,410	53,119	53,307	53,272	50,216	51,482	50,393	49,614	606,327
Kerosine	5,126	3,828	3,140	2,476	1,962	2,209	2,065	2,571	3,109	4,112	3,744	4,477	38,819
Distillate fuel oil	22,636	18,778	15,863	12,499	12,142	12,288	13,476	15,549	14,027	15,612	16,817	23,014	192,701
Liquefied petroleum gases	870	838	1,037	923	924	825	915	1,118	1,229	1,057	1,143	1,666	12,545
Delivered from lines:[1]													
Gasoline	45,397	42,564	49,079	49,519	54,606	54,136	52,598	53,686	50,140	52,724	50,239	49,534	604,222
Kerosine	4,849	4,532	3,238	2,296	2,016	1,984	1,785	2,297	2,702	3,733	3,497	4,363	37,292
Distillate fuel oil	23,651	20,242	16,990	12,979	11,067	10,792	12,017	13,474	13,523	15,246	16,521	23,559	190,061
Liquefied petroleum gases	806	888	749	911	794	746	833	1,098	1,189	1,036	1,155	1,456	11,661
Shortage (or overage):[2]													
Gasoline	55	226	(101)	(57)	137	103	205	(90)	215	(29)	151	(79)	736
Kerosine	129	80	78	42	73	57	56	54	62	86	80	85	882
Distillate fuel oil	(1)	9	(14)	11	(16)	10	13	13	23	9	26	14	97
Liquefied petroleum gases	51	52	51	23	23	1	7	(15)	25	27	69	71	385
Stocks in lines and working tanks at end of month:													
Gasoline	19,405	21,346	22,216	22,850	22,517	21,397	21,901	21,577	21,438	20,225	20,228	20,387	20,387
Kerosine	2,157	1,373	1,197	1,335	1,208	1,376	1,600	1,820	2,165	2,458	2,625	2,654	2,654
Distillate fuel oil	9,806	8,333	7,220	6,729	7,820	9,306	10,752	12,814	13,295	13,652	13,922	13,363	13,363
Liquefied petroleum gases	475	373	610	599	706	784	859	894	909	903	822	961	961
1957													
Turned into lines:[1]													
Gasoline	50,011	45,749	53,986	51,411	55,764	55,771	58,071	58,954	56,120	56,489	51,771	50,920	645,017
Kerosine	4,191	3,565	2,948	2,595	1,825	1,765	2,077	2,281	2,773	4,177	4,584	5,659	38,440
Distillate fuel oil	25,278	19,901	15,722	14,119	11,625	13,562	13,241	13,090	15,228	16,405	18,537	23,958	200,666
Liquefied petroleum gases	1,711	1,502	1,111	1,151	1,162	1,151	1,312	1,262	1,470	1,545	1,781	2,456	17,614
Delivered from lines:[1]													
Gasoline	49,109	44,722	52,992	51,683	56,333	55,623	58,842	59,758	55,268	56,855	51,870	51,606	644,661
Kerosine	4,927	3,638	3,100	2,705	1,593	1,486	1,943	2,049	2,451	3,721	4,506	5,529	37,648
Distillate fuel oil	26,632	21,584	17,679	14,287	11,039	11,604	12,205	11,930	14,473	15,537	19,110	23,937	200,017
Liquefied petroleum gases	1,780	1,385	1,155	1,088	1,093	1,020	1,113	1,102	1,352	1,457	1,700	2,261	16,506
Shortage (or overage):[2]													
Gasoline	127	17	(115)	15	73	165	----------	(158)	(162)	99	(146)	(42)	(127)
Kerosine	96	86	81	60	64	59	73	73	43	68	76	95	874
Distillate fuel oil	12	----------	(3)	19	8	15	3	43	100	44	92	103	436
Liquefied petroleum gases	67	52	19	42	27	13	12	51	50	54	62	79	528
Stocks in lines and working tanks at end of month:													
Gasoline	21,162	22,172	23,281	22,994	22,352	22,335	21,564	20,918	21,932	21,467	21,514	20,870	20,870
Kerosine	1,822	1,663	1,430	1,260	1,428	1,648	1,709	1,868	2,147	2,535	2,537	2,572	2,572
Distillate fuel oil	11,997	10,314	8,360	8,173	8,751	10,694	11,727	12,844	13,499	14,323	13,658	13,576	13,576
Liquefied petroleum gases	825	890	827	848	890	1,008	1,195	1,304	1,372	1,406	1,425	1,541	1,541

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[1] The quantities "Turned into lines" and "Delivered from lines" are on a net basis, eliminating intersystem transfers, and are not comparable with data published for previous years.

[2] Figures in parentheses represent overage.

TABLE 54.—Transportation of petroleum products by pipeline between PAW districts in the United States in 1956–57, by months

(Thousand barrels)

	January	February	March	April	May	June	July	August	September	October	November	December	Total
1956													
From District 1 to District 2:													
Gasoline	398	293	403	439	453	462	487	488	394	459	415	439	5,130
Kerosine	3	4	5	9	7	3	6	11	15	6	----------	3	72
Distillate fuel oil	9	20	21	25	17	47	34	----------	44	23	12	20	272
From District 2 to District 3:													
Gasoline	708	787	942	1,119	1,085	1,231	1,137	1,086	1,088	901	1,068	851	12,003
Kerosine	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Distillate fuel oil	538	347	359	299	250	347	509	501	554	734	479	579	5,496
From District 3 to District 1:													
Gasoline	3,064	2,906	3,590	3,426	3,734	3,549	3,595	3,919	3,467	3,322	3,335	3,351	41,258
Kerosine	1,218	1,128	506	422	412	392	484	517	865	947	787	1,137	8,815
Distillate fuel oil	1,205	1,112	937	629	729	778	1,001	826	711	956	921	1,000	10,805
From District 3 to District 2:													
Gasoline	2,283	2,581	2,967	3,084	3,340	3,318	3,330	3,120	2,845	3,221	3,083	2,560	35,732
Kerosine	187	169	64	117	34	59	122	31	79	100	112	176	1,250
Distillate fuel oil	1,214	891	747	463	538	462	413	671	451	858	783	989	8,480
From District 3 to District 4:													
Gasoline	318	254	286	298	299	309	303	298	317	273	195	277	3,427
Kerosine	22	23	19	16	14	5	6	5	5	20	14	22	171
Distillate fuel oil	30	10	19	20	21	13	29	18	17	41	37	[1] 22	[1] 277
From District 3 to District 5:													
Gasoline	165	113	309	293	337	284	294	314	248	282	401	400	3,440
Kerosine	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Distillate fuel oil	10	----------	10	10	32	14	28	23	34	34	26	32	253
From District 4 to District 5:													
Gasoline	346	433	383	480	600	472	527	543	553	524	497	460	5,818
Kerosine	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Distillate fuel oil	376	311	346	317	225	248	330	295	299	360	346	483	3,936
1957													
From District 1 to District 2:													
Gasoline	398	347	456	474	343	352	473	380	441	465	527	416	5,072
Kerosine	----------	6	5	9	----------	----------	----------	6	2	8	----------	13	49
Distillate fuel oil	36	42	7	21	----------	12	5	51	12	32	----------	34	252
From District 2 to District 3:													
Gasoline	838	749	872	1,058	1,270	1,459	1,626	1,391	1,302	1,143	962	1,049	13,719
Kerosine	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	2	2
Distillate fuel oil	852	672	790	380	296	364	366	550	593	735	725	717	7,040

From District 3 to District 1:													
Gasoline	3,472	3,486	3,856	3,399	3,910	3,945	3,673	3,907	3,725	3,720	3,952	3,628	44,673
Kerosine	1,422	782	622	430	287	356	647	532	684	682	811	1,235	8,490
Distillate fuel oil	1,094	1,256	886	718	696	682	979	865	950	975	920	1,400	11,421
From District 3 to District 2:													
Gasoline	2,812	2,470	3,623	2,751	3,645	3,518	3,579	3,431	3,448	3,194	2,711	2,624	37,806
Kerosine	173	117	105	77	48	85	40	45	52	104	121	226	1,193
Distillate fuel oil	879	838	566	652	344	456	395	804	675	803	953	1,057	8,422
From District 3 to District 4:													
Gasoline	248	224	267	234	260	307	304	269	332	289	303	284	3,321
Kerosine	24	28	10	12	12	7	4	6	11	15	13	24	166
Distillate fuel oil	17	15	24	21	23	20	22	24	17	8	39	19	249
From District 3 to District 5:													
Gasoline	382	328	396	382	372	325	341	339	361	406	354	376	4,362
Kerosine					1	1	1	1	1	1	1	91	98
Distillate fuel oil	32	52	46	52	23	47	29	53	39	31	46	51	501
From District 4 to District 5:													
Gasoline	545	462	508	556	534	475	580	587	548	609	564	528	6,496
Kerosine[2]	18	49	68	91	76	72	147	89	125	141	129	132	1,137
Distillate fuel oil	395	491	414	349	234	271	332	323	336	302	401	396	4,244

[1] Revised figure.

[2] Jet fuel.

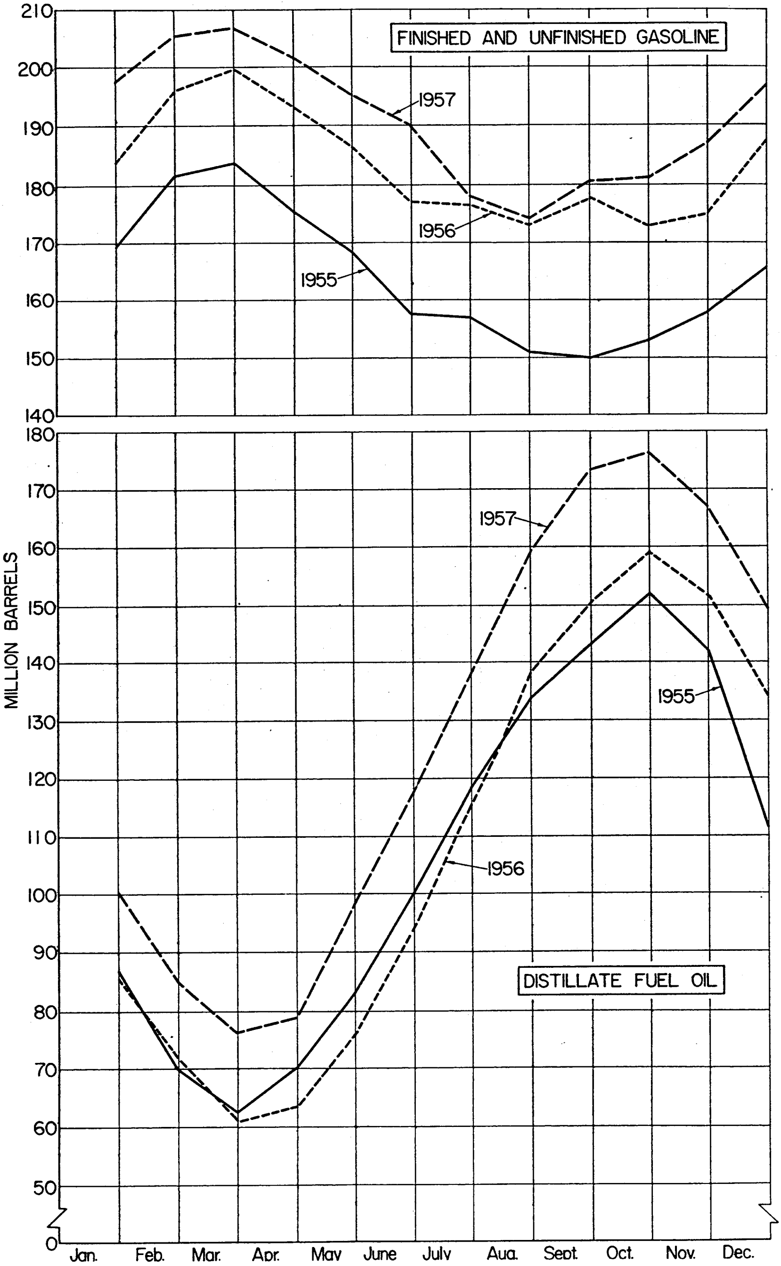

FIGURE 8.—Stocks of finished and unfinished gasoline in the United States and stocks of distillate fuel oil, 1955–57, by months.

Stocks.—Stocks of finished gasoline, as reported, include those held at refineries, at bulk terminals, and in pipelines but do not include those held by secondary distributors, by consumers, or in military custody. The Bureau of Mines definition of a bulk-terminal installation is any storage facility that receives its principal products by tanker, barge, or pipeline or any storage point with a combined capacity for storing gasoline, kerosine, distillate fuel oil, residual fuel oil, or jet fuels of 50,000 barrels or more, regardless of transportation means by which products are received.

There are definite normal seasonal variations in gasoline storage because of a summer peak and a winter low in gasoline demand. These stocks build up in the winter, although refinery yields are lower, and decrease sharply during the summer. This variation in stocks makes unnecessary large variations in seasonal yields of gasoline from crude oil. Distillate fuel oil follows the exact reverse of this pattern as demand is high in winter and low in summer.

Total stocks of gasoline at the end of 1957 were 10 million barrels higher than at the end of 1956, when they were considered above normal. In June 1957 stocks were 181 million barrels—13 million above the June 1956 figure. Stocks at the end of the third quarter were reduced 10 million barrels, and refiners increased the yield of gasoline from crude oil and maintained the increase for the balance of the year.

The supply of gasoline at the end of the 1957 was 61.9 days, compared with 56.8 days at the close of 1956.

TABLE 55.—Stocks of gasoline in the United States in 1957, by districts and months

(Thousand barrels)

	Jan. 31	Feb. 29	Mar. 31	Apr. 30	May 31	June 30	July 31	Aug. 31	Sept. 30	Oct. 31	Nov. 30	Dec. 31
Finished gasoline: [1]												
East Coast	38,958	40,183	41,796	41,886	40,792	41,630	39,293	40,981	42,644	42,877	43,103	41,895
Appalachian	7,127	7,644	7,955	7,409	7,305	7,358	6,712	6,785	6,897	7,025	7,551	7,555
Indiana, Illinois, Kentucky, etc	34,048	35,037	36,115	36,598	34,046	31,819	29,801	27,765	29,269	29,079	30,877	32,974
Minnesota, Wisconsin, North Dakota, and South Dakota	7,019	6,955	6,917	6,560	6,569	6,414	5,435	5,511	5,542	6,073	6,715	7,026
Oklahoma, Kansas, etc	18,530	19,524	20,386	19,101	17,215	16,250	14,352	13,854	13,993	13,751	14,511	16,473
Texas Inland	7,931	8,242	7,876	7,687	7,403	7,025	6,565	6,238	6,449	6,486	6,811	7,098
Texas Gulf Coast	23,886	25,676	23,566	22,364	22,388	21,041	20,407	20,358	20,988	20,867	20,131	23,633
Louisiana Gulf Coast	11,698	11,782	11,126	10,256	10,231	10,340	10,219	9,132	10,367	11,070	10,873	11,789
Arkansas, Louisiana Inland, etc	5,512	5,549	4,974	4,180	4,352	4,359	4,283	3,964	4,643	4,284	4,467	5,005
New Mexico	372	405	418	460	429	370	347	358	369	394	453	426
Other Rocky Mountain	6,597	7,389	7,902	7,556	7,262	6,930	6,047	5,171	5,174	5,025	5,623	6,236
West Coast	23,264	24,042	24,509	24,592	25,072	24,461	23,193	22,693	23,721	23,057	24,736	26,143
Total finished gasoline	184,942	192,428	193,540	188,649	183,064	177,997	166,654	162,810	170,056	169,988	175,851	186,253
Unfinished gasoline:												
East Coast	2,363	2,283	2,315	2,130	2,197	2,366	1,990	1,838	1,608	1,272	1,357	1,396
Appalachian	220	259	232	217	185	156	158	150	145	144	153	169
Indiana, Illinois, Kentucky, etc	2,030	2,102	1,968	1,825	1,802	1,828	1,664	1,820	1,735	1,576	1,497	1,419
Minnesota, Wisconsin, North Dakota, and South Dakota	3	1	4	4	3	2	1	1	3	2	3	7
Oklahoma, Kansas, etc	495	731	594	511	668	630	559	511	511	624	907	711
Texas Inland	361	290	229	311	344	354	313	434	338	386	281	366
Texas Gulf Coast	4,304	4,001	4,199	4,129	3,170	3,445	3,133	3,110	3,157	3,333	3,780	3,484
Louisiana Gulf Coast	534	587	553	541	622	539	499	465	488	533	500	466
Arkansas, Louisiana Inland, etc	1	1	2	1	1	1	2	1	1	1	1	1
New Mexico	------	------	------	------	------	------	------	------	------	------	------	------
Other Rocky Mountain	232	360	361	350	248	291	258	269	177	234	227	195
West Coast	2,217	2,227	2,719	2,739	2,790	2,454	2,637	2,622	2,469	2,809	2,584	2,309
Total unfinished gasoline	12,760	12,842	13,176	12,758	12,030	12,066	11,214	11,221	10,632	10,914	11,290	10,523
Total finished and unfinished gasoline:												
East Coast	41,321	42,466	44,111	44,016	42,989	43,996	41,283	42,819	44,252	44,149	44,460	43,291
Appalachian	7,347	7,903	8,187	7,626	7,490	7,514	6,870	6,935	7,042	7,169	7,704	7,724
Indiana, Illinois, Kentucky, etc	36,078	37,139	38,083	38,423	35,848	33,647	31,465	29,585	31,004	30,655	32,374	34,393
Minnesota, Wisconsin, North Dakota, and South Dakota	7,022	6,956	6,921	6,564	6,572	6,416	5,436	5,512	5,545	6,075	6,718	7,033
Oklahoma, Kansas, etc	19,025	20,255	20,980	19,612	17,883	16,880	14,911	14,365	14,504	14,375	15,418	17,184
Texas Inland	8,292	8,532	8,105	7,998	7,747	7,379	6,878	6,672	6,787	6,872	7,092	7,464
Texas Gulf Coast	28,190	29,677	27,765	26,493	25,558	24,486	23,540	23,468	24,145	24,200	23,911	27,117
Louisiana Gulf Coast	12,232	12,369	11,679	10,797	10,853	10,879	10,718	9,597	10,855	11,603	11,373	12,255
Arkansas, Louisiana Inland, etc	5,513	5,550	4,976	4,181	4,353	4,360	4,285	3,965	4,644	4,285	4,468	5,006
New Mexico	372	405	418	460	429	370	347	358	369	394	453	426
Other Rocky Mountain	6,829	7,749	8,263	7,906	7,510	7,221	6,305	5,440	5,351	5,259	5,850	6,431
West Coast	25,481	26,269	27,228	27,331	27,862	26,915	25,830	25,315	26,190	25,866	27,320	28,452
Total: 1957	197,702	205,270	206,716	201,407	195,094	190,063	177,868	174,031	180,688	180,902	187,141	196,776
1956	183,905	196,092	199,698	193,299	186,673	177,076	176,536	172,939	177,974	172,798	174,808	187,271

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[1] Includes stocks of finished gasoline at refineries and bulk terminals and in pipelines.

TABLE 56.—Days' supply of gasoline on hand in the United States at end of month, 1955–57 [1]

	1955			1956			1957 [2]		
	Finished and unfinished	Natural gasoline	Total gasoline	Finished and unfinished	Natural gasoline	Total gasoline	Finished and unfinished	Natural gasoline	Total gasoline
January	51.7	4.0	55.7	53.5	3.4	56.9	55.0	4.9	59.9
February	51.6	3.4	55.0	52.7	3.1	55.8	54.2	4.7	58.9
March	48.1	3.4	51.5	51.7	3.3	55.0	52.3	4.8	57.1
April	45.4	3.5	48.9	47.4	3.5	50.9	49.1	5.0	54.1
May	40.7	3.6	44.3	43.3	3.9	47.2	46.9	6.0	52.9
June	40.6	4.2	44.8	44.2	4.9	49.1	44.3	6.4	50.7
July	38.6	4.3	42.9	42.4	5.2	47.6	41.7	6.7	48.4
August	38.8	4.6	43.4	45.2	5.8	51.0	44.6	7.5	52.1
September	39.7	4.7	44.4	45.1	6.0	51.1	45.9	7.4	53.3
October	40.7	4.8	45.5	44.9	6.3	51.2	48.9	7.5	56.4
November	42.5	4.4	46.9	48.0	6.3	54.3	50.5	6.9	57.4
December	49.6	4.1	53.7	51.2	5.6	56.8	55.8	6.1	61.9

[1] Stocks divided by daily average total demand (domestic plus exports) for succeeding month.
[2] Preliminary figures.

Prices.—The average dealer net price for Regular Grade gasoline (exclusive of dealers' margin and sales tax) in 50 representative cities in the United States provides an index of wholesale gasoline prices. The average service-station price (excluding taxes) increased from 21.62 cents per gallon in 1956 to 22.11 cents in 1957. Total taxes increased 0.55 cent per gallon in 1957 to 8.85 cents.

TABLE 57.—Average monthly prices of gasoline in the United States, 1956–57, in cents per gallon

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for year
1956													
Monthly average at refineries in Oklahoma, regular, 88 octane[1]	11.25	11.25	11.33	11.38	11.73	11.88	11.88	11.88	11.88	11.76	11.63	11.63	11.62
Average of 50 cities on 1st of month:[2]													
Dealer's net (excluding tax)	16.32	16.24	16.31	16.42	16.41	16.60	16.34	16.46	16.30	16.40	16.17	16.15	16.34
Service station (including State, local, and Federal taxes)	29.44	29.24	29.12	29.23	29.28	29.56	30.63	30.80	30.43	30.62	30.46	30.33	29.93
1957													
Monthly average at refineries in Oklahoma, regular, 89 octane[1]	12.27	12.63	12.63	12.63	12.63	12.41	12.01	12.00	12.11	12.13	12.13	12.13	12.31
Average of 50 cities on 1st of month:[2]													
Dealer's net (excluding tax)	16.21	17.24	17.02	16.63	16.76	16.78	16.65	16.75	16.82	16.21	16.60	16.46	16.69
Service station (including State, local, and Federal taxes)	30.36	31.54	31.41	30.87	31.09	30.99	31.05	31.15	31.23	30.34	30.96	30.81	30.96

[1] Platt's Oil Price Handbook.

[2] Platt's Oilgram Price Service.

KEROSINE

The domestic demand for kerosine decreased considerably in 1957 in contrast to a small gain in 1956. However, exports increased substantially in 1957 compared with a small decline in 1956. Production of kerosine plus transfers from natural-gasoline plants decreased 12 percent in 1957. The smaller supply necessitated withdrawal of more than 2 million barrels from storage.

According to a survey made by the Bureau of Mines, sales of kerosine for range oil declined 12 percent in 1957 compared with a gain of 2 percent in 1956. The smaller demand for range oil evidently is due to increased use of natural gas in northern areas. The market for kerosine used as tractor fuel continued to decline in 1957, but total sales were only 2 percent below the previous year compared with a 12-percent decrease in 1956.

Exports of kerosine gained 60 percent in 1957 in contrast to a small decline in 1956. The larger shipments went to Mexico (1.3 million barrels), United Kingdom (0.9 million), Canada (0.4 million), and Argentina (0.4 million barrels).

Oil companies operating in District 5 shipped 10,000 barrels of kerosine by rail and truck to other Western States in 1957, compared with 13,000 barrels in 1956. Receipts into the area continued the decline of recent years dropping from 26,000 barrels in 1956 to 12,000 in 1957.

Kerosine shipped by tanker and barge from Gulf coast to east coast ports decreased 13 percent—from 45.6 million barrels in 1956 to 39.6 million in 1957. Kerosine credited to Texas declined from 35.4 million barrels in 1956 to 30.4 million in 1957, whereas kerosine originating in Louisiana declined from 10.3 million barrels in 1956 to 9.2 million in 1957.

TABLE 58.—Salient statistics of kerosine in the United States, 1956–57, by months and districts

(Thousand barrels)

Month and district	Production		Yield (percent)		Transfers from gasoline plants		Imports		Exports		Domestic demand		Stocks (end of period)	
	1956	1957 [1]	1956	1957 [1]	1956	1957 [1]	1956	1957 [1]	1956	1957 [1]	1956	1957 [1]	1956	1957 [1]
Month:														
January	11,940	11,384	4.7	4.4	245	200	------	30	222	1,069	17,423	17,946	21,310	24,019
February	11,165	9,874	4.8	4.3	173	210	------	------	66	937	13,870	12,153	18,712	21,013
March	10,590	10,307	4.3	4.2	147	149	------	------	148	955	12,086	10,291	17,215	20,223
April	8,978	8,520	4.0	3.7	203	143	------	------	189	627	7,980	6,747	18,227	21,512
May	9,058	8,440	3.7	3.5	138	143	------	------	335	394	5,205	4,327	21,883	25,374
June	8,704	7,617	3.6	3.5	105	124	------	------	239	417	4,342	3,826	26,111	28,872
July	9,170	7,718	3.7	3.2	135	136	------	------	255	65	6,171	4,948	28,990	31,713
August	9,716	7,804	3.9	3.1	108	141	------	------	112	254	6,876	4,828	31,826	34,576
September	9,872	8,284	4.1	3.5	125	118	9	------	123	110	8,121	6,486	33,588	36,382
October	11,044	8,230	4.6	3.5	144	119	------	------	356	262	8,753	10,085	35,667	34,384
November	11,508	9,709	4.8	4.3	107	139	1	------	581	94	12,373	11,442	34,329	32,696
December	11,735	11,042	4.6	4.5	151	158	------	------	671	103	14,124	14,593	31,420	29,200
Total	123,480	108,929	4.2	3.8	1,781	1,780	10	30	3,297	5,287	117,324	107,672	31,420	29,200
District:														
East Coast	13,125	11,633	3.1	2.6	------	------	(2)	(2)	(2)	(2)	(2)	(2)	12,979	12,934
Appalachian	3,778	3,491	5.0	4.9	------	------							1,089	1,098
Indiana, Illinois, Kentucky, etc	27,517	24,172	5.4	4.8	------	------							7,037	6,348
Minnesota, Wisconsin, North Dakota, etc	2,405	1,941	7.6	5.6	------	------							1,270	1,146
Oklahoma, Kansas, etc	5,648	5,326	2.3	2.1	------	------							1,371	1,204
Texas Inland	2,986	2,974	3.0	3.0	723	562							620	490
Texas Gulf Coast	41,948	37,102	5.9	5.4	589	609							2,846	2,707
Louisiana Gulf Coast	20,081	17,140	7.7	7.2	240	218							2,285	1,765
Arkansas, Louisiana Inland, etc	2,545	2,300	7.3	6.8	229	391							1,179	795
Rocky Mountain	1,632	1,172	1.5	1.1	------	------							440	354
West Coast	1,815	1,678	.4	.4	------	------							304	359
Total	123,480	108,929	4.2	3.8	1,781	1,780	10	30	3,297	5,287	117,324	107,672	31,420	29,200

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[1] Preliminary figures.
[2] Not available.

TABLE 59.—Sales of kerosine[1] in the United States, 1956–57, by districts, States, and uses

(Thousand barrels)

District[2] and State	Sold as range oil		Tractor fuel		All other uses		Total	
	1956	1957	1956	1957	1956	1957	1956	1957
District 1:								
Connecticut	4,382	3,528	8	6	377	234	4,767	3,768
Delaware	676	625	3	2	59	22	738	649
District of Columbia	188	155	3	3	61	12	252	170
Florida	1,889	1,875	92	73	811	743	2,792	2,691
Georgia	1,888	1,759	192	188	627	502	2,707	2,449
Maine	2,991	2,883	18	22	208	182	3,217	3,087
Maryland	1,564	1,454	85	76	541	483	2,190	2,013
Massachusetts	9,932	8,859	31	29	807	639	10,770	9,527
New Hampshire	1,472	1,198	6	4	42	33	1,520	1,235
New Jersey	3,702	3,607	17	16	1,559	1,432	5,278	5,055
New York	8,175	7,047	128	124	731	667	9,034	7,838
North Carolina	8,832	8,842	52	50	3,742	3,008	12,626	11,900
Pennsylvania	2,348	2,228	95	97	1,296	1,002	3,739	3,327
Rhode Island	2,714	2,210	26	25	67	26	2,807	2,261
South Carolina	3,861	3,676	36	42	1,356	1,162	5,253	4,880
Vermont	579	574	16	14	37	35	632	623
Virginia	2,417	2,360	20	18	858	766	3,295	3,144
West Virginia	121	130	3	2	110	94	234	226
Total	57,731	53,010	831	791	13,289	11,042	71,851	64,843
District 2:								
Illinois	3,407	2,937	196	193	1,207	986	4,810	4,116
Indiana	2,241	1,674	54	54	1,457	1,134	3,752	2,862
Iowa	1,635	1,174	191	188	717	671	2,543	2,033
Kansas	859	786	72	72	213	200	1,144	1,058
Kentucky	828	761	44	33	344	323	1,216	1,117
Michigan	3,372	2,811	52	49	1,469	1,361	4,893	4,221
Minnesota	1,981	1,385	11	12	487	400	2,479	1,797
Missouri	1,857	1,419	33	36	592	503	2,482	1,958
Nebraska	681	519	31	36	148	140	860	695
North Dakota	887	695	41	37	90	78	1,018	810
Ohio	1,636	1,346	65	67	651	564	2,352	1,977
Oklahoma	506	401	90	94	590	557	1,186	1,052
South Dakota	422	409	31	32	60	48	513	489
Tennessee	1,643	1,409	50	54	524	484	2,217	1,947
Wisconsin	1,538	1,195	62	64	747	687	2,347	1,946
Total	23,493	18,921	1,023	1,021	9,296	8,136	33,812	28,078
District 3:								
Alabama	768	593	127	125	493	423	1,388	1,141
Arkansas	702	542	103	101	484	467	1,289	1,110
Louisiana	643	437	57	54	507	480	1,207	971
Mississippi	521	467	85	84	650	618	1,256	1,169
New Mexico	188	144	18	17	52	53	258	214
Texas	1,464	1,060	208	215	2,042	1,691	3,714	2,966
Total	4,286	3,243	598	596	4,228	3,732	9,112	7,571
District 4:								
Colorado	205	197	5	7	24	20	234	224
Idaho	20	31	1	1	25	19	46	51
Montana	160	156	5	4	48	41	213	201
Utah	26	8	1	1	9	12	36	21
Wyoming	41	32	1	1	96	75	138	108
Total	452	424	13	14	202	167	667	605
District 5:								
Arizona	----	----	----	----	38	38	38	38
California	82	51	----	----	1,090	1,048	1,172	1,099
Nevada	----	----	----	----	----	----	----	----
Oregon	3	1	----	----	73	58	76	59
Washington	3	----	----	----	103	85	106	85
Total	88	52	----	----	1,304	1,229	1,392	1,281
Total United States	86,050	75,650	2,465	2,422	28,319	24,306	116,834	102,378

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[1] Total sales of kerosine for 1957 are below the domestic demand shown in Monthly Petroleum Statement 425 for December 1957, as some kerosine was reported as sold for jet fuel.

[2] States are grouped according to petroleum-marketing districts rather than conventional geographic regions.

Kerosine shipped by barge from the Gulf coast and Arkansas to terminals on the Mississippi River and its tributaries totaled 4.4 million barrels in 1957 compared with 4.5 million in 1956. The kerosine in this traffic credited to Texas increased 6 percent (from 704 thousand barrels in 1956 to 743 thousand in 1957), whereas that loaded in Louisiana declined 44 percent (from 2.9 million barrels in 1956 to 1.6 million in 1957). The quantity coming from Arkansas and Mississippi more than doubled, increasing from 0.9 million barrels in 1956 to 2.0 million in 1957. Most of the kerosine handled in these river shipments was unloaded in District 2—4.4 million barrels in 1956 and 4.2 million in 1957. Only small quantities reached District 1.

The tanker freight rate for kerosine on the Gulf coast-New York Harbor run had a downward trend in 1957 in contrast to an upward trend in 1956. The average charge dropped from 56.3 cents a barrel in 1956 to 35.3 cents in 1957. A "high" of $1.184 was posted in February 1957, and a "low" of 23.1 cents was announced in August.

TABLE 60.—Sales of range oil[1] in the United States, 1955–57, by States

(Thousand barrels)

State	1955	1956	1957	
			Total	Percent of United States total
Massachusetts	11,556	10,634	9,532	10.3
North Carolina	8,180	9,124	9,118	9.9
New York	8,508	8,784	7,637	8.3
Illinois	6,149	6,275	5,789	6.3
Michigan	6,248	6,003	5,334	5.8
Connecticut	4,849	4,703	3,837	4.1
South Carolina	3,400	4,013	3,823	4.1
New Jersey	4,065	3,927	3,815	4.1
Maine	3,341	3,222	3,105	3.3
Wisconsin	3,320	3,222	2,858	3.1
Indiana	3,330	3,257	2,648	2.9
Pennsylvania	2,642	2,699	2,557	2.8
Virginia	2,484	2,541	2,485	2.7
Minnesota	2,698	3,102	2,400	2.6
Rhode Island	2,601	2,816	2,301	2.5
Missouri	2,462	2,673	2,202	2.4
Iowa	2,754	2,669	2,149	2.3
Florida	1,881	1,977	1,964	2.1
Ohio	2,166	2,218	1,917	2.1
Georgia	1,931	1,993	1,860	2.0
Maryland	1,639	1,615	1,512	1.6
Tennessee	1,650	1,709	1,470	1.6
Texas	1,941	1,813	1,408	1.5
New Hampshire	1,457	1,592	1,316	1.4
Kentucky	1,080	1,214	1,144	1.2
All other	9,373	9,690	8,301	9.0
Total	101,705	103,485	92,482	100.0

Includes mostly kerosine and a small quantity of No. 1 fuel oil.

TABLE 61.—Monthly average prices of kerosine in the United States, 1956–57 in cents per gallon

[Platt's Oil Price Handbook]

Year and grade	January	February	March	April	May	June	July	August	September	October	November	December	Average for year
1956													
42°–44° gravity, water-white kerosine at refineries, Oklahoma	10.21	10.37	10.38	10.23	10.13	10.13	10.13	10.13	10.13	10.13	10.13	10.19	10.19
Kerosine (and/or No. 1 fuel oil) at New York Harbor	11.04	11.10	11.10	11.10	11.10	11.10	11.10	11.10	11.10	11.47	11.50	11.50	11.19
Kerosine, tank-wagon at Chicago	17.00	17.10	17.10	17.10	17.10	17.10	17.10	17.10	17.10	17.10	17.10	17.10	17.10
Kerosine, tank-wagon at New York City [1]	15.00	15.20	15.30	15.30	15.30	15.30	15.30	15.30	15.30	15.80	15.80	15.80	15.40
1957													
42°–44° gravity, water-white kerosine at refineries, Oklahoma	10.90	11.11	10.85	10.75	10.75	10.60	10.50	10.48	10.25	10.25	10.25	10.25	10.58
Kerosine (and/or No. 1 fuel oil) at New York Harbor	12.11	12.50	12.50	12.50	12.35	12.19	11.84	11.28	11.25	11.25	11.25	11.25	11.86
Kerosine, tank-wagon at Chicago	17.80	18.10	17.79	17.12	17.10	17.10	17.10	17.10	17.10	17.10	17.10	17.10	17.30
Kerosine, tank-wagon at New York City [1]	16.35	16.80	16.80	16.80	16.53	16.37	15.93	15.41	15.40	15.40	15.40	15.40	16.05

[1] Manhattan and Queens.

DISTILLATE FUEL OIL

Production of distillate fuel oil at refineries showed little change in 1957; both crude runs and percentage yield were virtually the same as in 1956. Imports of distillate, which represent about 1 percent of the supply, increased 65 percent in 1957 compared with only 17 percent in 1956. "Transfers" of distillate fuel oil from crude-petroleum and natural-gasoline plants have added small quantities to the available supply in recent years. Considerable distillate fuel oil was added to storage in 1957; however, the quantity was 32 percent below the increase in stocks in 1956. Exports of distillate fuel oil gained substantially in 1957, as in 1956.

Warmer weather and a smaller percentage gain in the number of domestic oil-burner installations compared with previous years resulted in only a small increase in domestic demand for distillate in 1957.

Sales of distillate fuel oils to vessels and for military uses showed large gains in 1957, and moderate gains were reported in sales for heating, oil-company fuel, and miscellaneous uses. Deliveries credited to railroads and gas and electric powerplants and sales of No. 1 fuel oil for range oil were below the 1956 totals. Purchases of distillate fuel oils by vessels increased 11 percent in 1957. Records compiled by the Bureau of the Census, United States Department of Commerce, show that diesel fuel sold to vessels engaged in foreign trade increased 26 percent—from 10.4 million barrels in 1956 to 13.1 million in 1957. The indicated total of light bunker fuel delivered to vessels using coastal and inland waterways declined 9 percent—from 8.1 million barrels in 1956 to 7.4 million in 1957.

Sales of light fuel oils, mostly diesel grades, to railroads declined for the first time in 1957, when requirements were 1 percent below those in 1956. Sales of distillate fuel oils to gas and electric powerplants decreased 2 percent in 1957, and smaller consumption by these plants was reported by the Federal Power Commission and American Gas Association. Sales of light fuel oils to manufactured-gas companies dropped 31 percent—from 1.6 million barrels in 1956 to 1.1 million in 1957. Electric generating plants used 5 percent less light fuel oil—4.0 million barrels in 1957 compared with 4.2 million in 1956.

Exports of distillate fuel oils rose 35 percent in 1957 compared with a 40-percent increase in 1956. The largest shipments went to the United Kingdom (11.0 million barrels), Japan (5.8 million), Canada (5.2 million), France (4.1 million), Netherlands (3.6 million), and Mexico (3.1 million barrels).

Most imports of distillate fuel oil previously came from the Netherland Antilles; however, in 1957 substantial shipments were received from Venezuela.

Some light crude oil used as fuel by pipeline companies is added as "transfers" to the distillate-fuel-oil supply. The 1957 total was slightly below that reported in 1956. Small quantities of distillate fuel oil produced at natural-gasoline plants also are added as "transfers." There was a small gain in the fuel oils from this source in 1957.

TABLE 62.—Salient statistics of distillate fuel oil in the United States, 1956–57, by months and districts

(Thousand barrels)

Month and district	Production		Yield (percent)		Transfers from gasoline plants		Transfers [1] east of California		Imports		Exports		Domestic demand		Stocks (end of period)	
	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]
Month:																
January	59,617	65,662	23.7	25.2	96	51	134	132	383	570	1,694	6,864	83,728	92,960	86,141	100,572
February	55,622	56,970	23.8	25.0	44	78	114	114	455	723	1,849	7,537	69,192	65,815	71,335	85,105
March	56,045	57,680	22.9	23.5	103	71	127	131	599	887	1,754	6,774	65,609	60,855	60,846	76,245
April	51,387	52,934	22.9	22.9	57	65	102	122	387	634	2,621	5,266	46,587	45,991	63,571	78,743
May	51,665	55,444	21.4	22.6	64	74	108	122	391	510	1,551	3,950	38,320	32,883	75,928	98,060
June	52,640	53,180	22.0	22.6	67	59	106	107	423	444	1,958	2,516	33,448	31,970	93,758	117,364
July	54,775	54,236	22.1	22.3	77	67	111	109	441	537	1,885	2,834	31,490	31,120	115,787	138,359
August	57,007	55,979	22.6	22.3	59	85	115	96	390	1,042	2,420	2,763	33,033	33,674	137,905	159,124
September	55,354	53,164	23.0	22.2	57	67	108	100	405	822	2,387	1,646	41,031	38,362	150,411	173,269
October	54,917	52,863	22.9	22.3	74	82	104	92	518	1,014	2,868	2,263	44,285	48,669	158,871	176,388
November	55,245	52,006	23.2	22.8	58	88	116	91	372	592	5,391	2,373	57,754	60,029	151,517	166,763
December	61,413	58,455	24.0	23.7	62	79	130	89	395	752	8,157	1,929	71,379	74,760	133,981	149,449
Total	665,687	668,573	22.9	23.1	818	866	1,375	1,305	5,159	8,527	34,535	46,715	615,856	617,088	133,981	149,449
District:																
East Coast	110,069	118,145	26.2	26.8	--------	--------	--------	--------	(3)	(3)	(3)	(3)	(3)	(3)	51,634	58,855
Appalachian	15,497	14,098	20.7	19.7	--------	--------	--------	--------							4,208	4,318
Indiana, Illinois, Kentucky, etc	104,954	105,975	20.5	20.9	--------	--------	333	288							20,981	20,241
Minnesota, Wisconsin, etc	8,057	9,198	25.6	26.6	--------	--------	--------	--------							7,831	7,159
Oklahoma, Kansas, etc	61,667	61,607	24.6	23.9	--------	--------	152	158							12,315	10,999
Texas Inland	18,816	18,278	19.0	18.5	274	269	496	453							1,917	2,023
Texas Gulf Coast	185,161	180,525	26.2	26.5	219	264	136	136							11,795	17,523
Louisiana Gulf Coast	66,197	64,658	25.5	27.1	27	25	37	44							5,483	7,125
Arkansas, Louisiana Inland, etc	7,986	7,651	23.0	22.6	298	308	28	34							1,913	2,093
Rocky Mountain	24,545	25,168	22.8	23.0	--------	--------	193	192							2,819	3,044
West Coast	62,738	63,270	15.3	15.2	--------	--------	--------	--------							13,085	16,069
Total	665,687	668,573	22.9	23.1	818	866	1,375	1,305	5,159	8,527	34,535	46,715	615,856	617,088	133,981	149,449

[1] Figures represent crude oil used as fuel on pipelines, which is considered part of the demand for distillate.

[2] Preliminary figures.

[3] Figures not available.

Rail and truck shipments of distillate fuel oils from District 5 to other Western States totaled 472,000 barrels in 1957—12 percent below the 1956 total of 535,000 barrels, which in turn was 15 percent below the 1955 total. Receipts, including imports of distillate fuel oils in District 5, totaled 6.1 million barrels in 1957, a 9-percent gain over the 1956 quantity (5.5 million barrels). Light fuel oils from outside sources comprised 9 percent of the total supply in the area in 1957 and 8 percent in 1956.

Oil companies shipped 166.9 million barrels of distillate fuel oil from the Gulf coast to terminals on the Atlantic coast in 1957, a decline of 13 percent from the 1956 total of 191.7 million, according to statistics released by the Office of Oil and Gas, United States Department of the Interior. Quantities loaded in Texas declined from 152.4 million barrels in 1956 to 130.5 million in 1957, and shipments from Louisiana were 36.4 million barrels in 1957 compared with 39.3 million in 1956.

Barge movements of distillate fuel oil from the Gulf coast and Arkansas to terminals on the Mississippi River and its tributaries declined 19 percent—from 13.5 million barrels in 1956 to 10.9 million in 1957. Shipments by barge from Texas declined from 2.4 million barrels in 1956 to 1.0 million in 1957 and those from Louisiana dropped from 5.0 million barrels in 1956 to 3.1 million in 1957, whereas barge shipments from Arkansas and Mississippi increased 10 percent—from 6.1 million barrels in 1956 to 6.7 million in 1957. Distillate fuel oils shipped by barge and unloaded in District 2 declined from 12.4 million barrels in 1956 to 10.4 million in 1957. Movements to District 1 dropped from 1.1 million barrels in 1956 to 0.5 million in 1957.

There was a downward trend in 1957 in the tanker freight rate for No. 2 distillate fuel oil on the Gulf coast-New York Harbor run. The yearly average declined from 59.2 cents a barrel in 1956 to 37.4 cents in 1957. The "high" for 1957 ($1.247 a barrel) was posted in February, and the "low" (24.8 cents) was announced in August.

TABLE 63.—Sales of distillate fuel oil[1] in the United States, 1953–57, by uses

(Thousand barrels)

Uses	1953	1954	1955	1956	1957	Change (percent)
Railroads	75, 246	77, 389	84, 668	89, 439	88, 315	−1. 3
Vessels (including tankers)	16, 898	15, 563	16, 675	18, 487	20, 420	10. 5
Gas and electric powerplants	6, 825	6, 070	5, 884	5, 403	5, 296	−2. 0
Smelters, mines, and manufacturing industries	42, 384	41, 589	43, 606	44, 949	43, 532	−3. 2
Heating oils	267, 598	304, 540	339, 215	359, 827	360, 212	0. 1
Fuel oil (No. 1) sold as range oil	15, 602	15, 577	17, 374	17, 435	16, 832	−3. 5
U. S. Army, Navy, Air Force, and Coast Guard	9, 569	8, 752	10, 945	11, 326	12, 737	12. 5
Oil-company fuel	7, 755	7, 699	8, 597	10, 131	10, 419	2. 8
Miscellaneous uses	47, 067	49, 066	54, 163	58, 778	59, 512	1. 2
Total United States	488, 844	526, 245	581, 127	615, 775	617, 275	0. 2

[1] Includes diesel fuel.

TABLE 64.—Sales of distillate fuel oil [1] in the United States, 1953–57, by districts and States

(Thousand barrels)

District [2] and State	1953	1954	1955	1956	1957
District 1:					
Connecticut	12,520	14,928	16,071	18,490	18,574
Delaware	1,861	2,365	2,677	3,235	3,245
District of Columbia	3,458	3,728	3,907	4,139	4,124
Florida	7,176	8,441	9,613	10,169	10,188
Georgia	4,119	4,225	4,560	4,914	4,877
Maine	4,514	5,309	5,703	6,425	6,426
Maryland	11,731	14,468	16,009	17,916	18,091
Massachusetts	27,925	31,306	34,036	35,859	35,981
New Hampshire	3,370	4,220	4,498	5,123	5,089
New Jersey	33,124	35,733	38,971	41,335	41,370
New York	59,604	64,262	70,276	72,606	72,755
North Carolina	7,381	7,860	8,982	9,279	9,312
Pennsylvania	36,513	40,288	44,286	45,734	45,698
Rhode Island	4,482	4,484	4,762	5,513	5,530
South Carolina	3,004	2,990	3,259	3,445	3,588
Vermont	1,321	1,415	1,726	1,937	1,883
Virginia	9,442	10,888	13,242	14,293	14,782
West Virginia	1,331	1,307	1,500	2,095	2,039
Total	232,876	258,217	284,078	302,507	303,552
District 2:					
Illinois	29,021	30,388	33,371	35,290	35,350
Indiana	15,166	16,294	18,962	20,441	20,482
Iowa	10,488	10,399	11,417	12,543	12,548
Kansas	5,938	5,897	6,493	6,388	6,361
Kentucky	3,359	3,291	4,126	4,476	4,548
Michigan	22,351	24,625	27,402	29,071	28,995
Minnesota	15,784	16,218	17,409	18,765	18,726
Missouri	10,854	11,283	12,137	12,306	12,418
Nebraska	4,378	4,723	5,229	5,561	5,549
North Dakota	2,425	2,600	3,151	3,740	3,726
Ohio	16,542	18,150	20,184	21,937	22,045
Oklahoma	2,436	2,368	2,493	2,454	2,470
South Dakota	2,626	2,756	3,298	3,556	3,508
Tennessee	3,628	3,529	3,845	3,767	3,652
Wisconsin	11,877	13,648	16,089	17,099	17,149
Total	156,873	166,169	185,606	197,394	197,527
District 3:					
Alabama	3,186	3,508	3,914	4,277	4,326
Arkansas	2,222	2,136	2,357	2,558	2,575
Louisiana	6,212	6,242	7,385	7,653	7,877
Mississippi	1,774	1,619	1,808	1,840	1,856
New Mexico	1,309	1,457	1,991	2,167	2,205
Texas	19,046	18,913	20,728	22,258	22,812
Total	33,749	33,875	38,183	40,753	41,651
District 4:					
Colorado	2,732	3,108	3,371	3,532	3,585
Idaho	2,595	3,080	3,706	3,837	3,834
Montana	3,553	3,755	3,980	4,219	4,209
Utah	3,542	3,574	3,994	4,235	4,256
Wyoming	2,294	2,624	2,829	3,092	2,977
Total	14,716	16,141	17,880	18,915	18,861
District 5:					
Arizona	1,329	1,279	1,073	1,716	1,742
California	24,063	23,812	23,873	24,643	24,613
Nevada	2,281	2,375	1,686	1,748	1,679
Oregon	8,680	8,939	10,981	10,862	10,132
Washington	14,277	15,438	17,767	17,237	17,518
Total	50,630	51,843	55,380	56,206	55,684
Total United States	488,844	526,245	581,127	615,775	617,275

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[1] Includes diesel fuel oil.

[2] States are grouped according to petroleum-marketing districts rather than conventional geographic regions.

TABLE 65.—Monthly average prices of distillate fuel oil and diesel fuel in the United States, 1956–57

[Platt's Oil Price Handbook]

Year and grade	January	February	March	April	May	June	July	August	September	October	November	December	Average for year
1956													
No. 2 fuel oil at refineries, Oklahoma cents per gallon	9.11	9.37	9.38	9.27	9.22	9.19	9.19	9.19	9.19	9.19	9.19	9.27	9.23
No. 2 fuel oil at New York Harbor cents per gallon	10.54	10.60	10.60	10.60	10.60	10.60	10.60	10.60	10.60	10.90	10.90	10.90	10.67
Diesel oil, shore plants, New York Harbor cents per gallon	10.94	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.31	11.30	11.30	11.07
Diesel oil for ships:													
New York dollars per barrel	4.44	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.47	4.61	4.60	4.60	4.50
New Orleans do	4.03	4.03	4.03	4.03	4.03	4.03	4.03	4.03	4.03	4.03	4.03	4.03	4.03
San Pedro do	4.33	4.35	4.80	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.93	5.04	4.77
1957													
No. 2 fuel oil at refineries, Oklahoma cents per gallon	10.02	10.24	9.99	9.94	9.94	9.77	9.69	9.65	9.19	9.19	9.19	9.19	9.67
No 2 fuel oil at New York Harbor cents per gallon	11.51	11.90	11.90	11.90	11.75	11.61	11.30	10.78	10.75	10.75	10.75	10.75	11.30
Diesel oil, shore plants, New York Harbor cents per gallon	11.91	12.30	12.30	12.30	12.15	12.02	11.72	11.20	11.15	11.15	11.15	11.15	11.71
Diesel oil for ships:													
New York dollars per barrel	4.85	5.02	5.02	5.02	4.96	4.89	4.77	4.55	4.54	4.54	4.54	4.54	4.77
New Orleans do	4.29	4.45	4.45	4.45	4.45	4.42	4.35	4.21	4.20	4.20	4.20	4.20	4.32
San Pedro do	5.12	5.25	5.25	5.25	5.25	5.29	5.38	5.38	5.38	5.38	5.38	5.38	5.31

RESIDUAL FUEL OIL

The supply of residual fuel oil from all sources in 1957 increased about 1 percent over 1956. The quantity originating at petroleum refineries was 3 percent lower in 1957 and represented 69 percent of the supply compared with 72 percent in 1956. Imports of residual fuel oils increased 6 percent in 1957 and accounted for 29 percent of the supply compared with 27 percent in 1956. "Transfers" or heavy crude oil used as fuel on leases or for industrial purposes comprised 1 percent of the supply in 1956 and 2 percent in 1957.

The total demand for residual fuel oils in 1957 was virtually unchanged compared with 1956. Domestic demand was 2 percent less in 1957 than in 1956 and comprised 94 percent of total demand compared with 95 percent in 1956. Exports in 1957 were more than a third higher than in 1956.

Sales of residual fuel oils to vessels and to gas and electric powerplants increased in 1957, but sales for all other principal uses declined. The total sales of heavy bunker oils to vessels increased 5 percent. The quantity bought by vessels engaged in foreign trade increased 13 percent—from 69.5 million barrels in 1956 to 78.7 million in 1957. The increase was due to a tendency for these vessels to take on bunker fuel oil in American ports instead of foreign ports. The quantity of heavy fuel sold to vessels using coastal and inland waterways was 6 percent lower—47.9 million barrels in 1956 and 44.9 million in 1957. Sales of residual fuel oils to gas and electric powerplants were 3 percent higher in 1957. The bulk was consumed by electric powerplants. Total sales increased 10 percent—from 68.5 million barrels in 1956 to 75.5 million in 1957. Sales to manufactured-gas companies dropped more than 50 percent—from 4.2 million barrels in 1956 to 2.0 million in 1957.

Residual fuel oils purchased by railroads continued to decline because of the shift to diesel fuel. Total sales to railroads declined 34 percent in 1957, compared with a 30-percent decline in 1956. The 7-percent loss in sales of heavy fuel oils for space heating was due largely to the warmer weather that prevailed in 1957.

Exports of residual fuel oils increased 36 percent in 1957 in contrast to a decrease of 18 percent in 1956. The larger shipments went to Canada (5.9 million barrels), Japan (5.6 million), the United Kingdom (5.1 million), and Mexico (3.1 million barrels).

A small decline in crude runs to stills and a lower percentage yield (14.4 percent in 1957 compared with 14.7 percent in 1956) resulted in a decrease of about 3 percent in production of residual fuel oils in 1957.

The supply of residual fuel oils in 1957 was not only adequate to meet domestic and export demands but also provided a surplus of 15.5 million barrels for storage compared with a surplus of 5.3 million barrels in 1956. Stocks increased 35 percent in 1957 and 14 percent in 1956.

Residual fuel oils held at refineries at the end of 1957 composed 83 percent of all stocks compared with 77 percent in 1956. The 1957 total was 46 percent above that at the close of 1956, which in turn was 17 percent over the 1955 total. Residual-fuel-oil stocks reported at bulk terminals and in pipelines at the end of 1957 were 2 percent below 1956, in contrast to a gain of 2 percent in 1956. Stocks at the

TABLE 66.—Salient statistics of residual fuel oil in the United States, 1956–57, by months and districts

(Thousand barrels)

Month and district	Production		Yield (percent)		Transfers [1] East of California		Transfers [1] California		Imports		Exports		Domestic demand		Stocks (end of period)	
	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]
Month:																
January	41,674	40,990	16.5	15.8	351	679	147	155	18,218	17,557	1,696	4,287	59,621	61,182	38,247	38,403
February	37,291	35,546	16.0	15.6	334	578	84	150	15,729	16,186	1,616	3,979	54,396	50,683	35,673	36,201
March	37,618	37,351	15.4	15.2	362	888	227	109	13,608	17,421	1,905	3,963	52,599	50,636	32,984	37,371
April	33,892	33,964	15.1	14.7	408	909	243	206	14,146	16,711	2,191	4,007	46,742	47,725	32,740	37,429
May	35,609	34,196	14.8	14.0	399	967	252	120	13,637	14,264	2,343	3,411	43,687	42,529	36,607	41,036
June	32,951	33,033	13.8	14.0	346	956	164	125	11,469	12,045	2,465	3,193	39,999	38,430	39,073	45,572
July	33,037	33,776	13.4	13.9	371	1,202	200	202	10,151	11,088	2,657	3,159	36,217	39,060	43,958	49,621
August	33,823	33,754	13.4	13.5	327	1,346	217	152	10,399	11,134	2,627	2,997	39,480	40,365	46,617	52,645
September	31,868	32,987	13.2	13.8	325	870	192	200	9,899	10,083	2,072	1,979	39,487	36,079	47,342	58,727
October	33,543	32,602	14.0	13.8	330	862	120	123	14,817	13,318	2,038	2,505	45,714	43,102	48,400	60,025
November	35,471	32,059	14.9	14.1	336	1,315	150	223	13,415	14,101	2,692	2,129	50,490	45,972	44,590	59,622
December	39,922	35,398	15.6	14.4	384	1,342	170	205	17,381	19,293	3,575	2,182	54,381	53,719	44,491	59,959
Total	426,699	415,656	14.7	14.4	4,273	[3] 11,914	2,166	1,970	162,869	173,201	27,877	37,791	562,813	549,482	44,491	59,959
District:																
East Coast	75,801	76,494	18.0	17.4	-------	[3] 7,361	-------	-------	(4)	(4)	(4)	(4)	(4)	(4)	12,594	13,312
Appalachian	7,497	7,265	10.0	10.2	-------	-------	-------	-------							645	1,191
Indiana, Illinois, Kentucky, etc	64,791	63,475	12.6	12.5	1,055	1,167	-------	-------							5,817	5,905
Minnesota, Wisconsin, etc	2,615	3,290	8.3	9.5	36	184	-------	-------							387	494
Oklahoma, Kansas, etc	12,116	12,016	4.8	4.7	381	388	-------	-------							1,499	1,327
Texas Inland	8,999	8,362	9.1	8.5	714	812	-------	-------							1,947	2,153
Texas Gulf Coast	91,913	83,230	13.0	12.2	606	633	-------	-------							5,544	6,138
Louisiana Gulf Coast	19,089	17,821	7.4	7.5	700	746	-------	-------							1,757	1,515
Arkansas, Louisiana Inland, etc	2,164	2,421	6.2	7.2	300	260	-------	-------							266	232
Rocky Mountain	14,368	14,285	13.4	13.1	481	363	-------	-------							956	1,084
West Coast	127,346	126,997	31.1	30.4	-------	-------	2,166	1,970							13,079	26,608
Total	426,699	415,656	14.7	14.4	4,273	[3] 11,914	2,166	1,970	162,869	173,201	27,877	37,791	562,813	549,482	44,491	59,959

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[1] Represents crude oil used as fuel on leases and for general industrial purposes.

[2] Preliminary figures.

[3] Includes heavy crude oil imported and used directly as fuel oil.

[4] Figures not available.

close of 1957 represented a 33-day supply at the January 1958 daily rate of demand compared with a 23-day supply at the end of 1956.

Shipments of residual fuel oils from District 5 changed little in 1957—18.2 million barrels compared with 18.4 million in 1956. Exports from the area also remained virtually the same—11.2 million barrels in 1957 and 11.5 million in 1956. Shipments to Alaska and Hawaii increased 12 percent in 1957. No residual fuel oils moved by tanker from the west coast to the east coast in 1957, and only a small quantity in 1956. Rail and truck shipments from District 5 totaled only 36,000 barrels in 1957 compared with 418,000 barrels in 1956. Receipts and imports of residual fuel oils into District 5 continued the decline of recent years and dropped from 0.8 million barrels in 1956 to 0.4 million in 1957.

Tanker and barge shipments of residual fuel oils from Gulf coast to Atlantic coast ports declined 12 percent—from 55.7 million barrels in 1956 to 48.9 million in 1957. Loadings in Texas dropped from 51.6 million barrels in 1956 to 46.1 million in 1957, and loadings in Louisiana also were lower—2.7 million barrels in 1957 compared with 4.2 million in 1956.

The quantity of residual fuel oil shipped up the Mississippi River and its tributaries by barge from the Gulf coast and Arkansas continued to drop and declined from 6.3 million barrels in 1956 to 3.4 million in 1957, a loss of 46 percent. The quantity loaded in Texas declined from 4.6 million barrels in 1956 to 2.5 million in 1957, a loss of 46 percent. The quantity shipped from Louisiana also declined—from 1.6 million barrels in 1956 to 0.9 million in 1957. Little residual fuel oil was shipped by barge from Arkansas and Mississippi in 1956 and none in 1957. Residual fuel oil moved by barge and unloaded in District 2 declined from 3.6 million barrels in 1956 to 2.2 million in 1957. The quantity reaching District 1 also was lower—1.1 million barrels in 1957 compared with 2.7 million in 1956.

The tanker freight rate for Bunker "C" fuel oil on the Gulf coast-New York Harbor run in 1957 declined, as did the rate for kerosine and No. 2 distillate fuel oil. The 1956 average of 74.2 cents a barrel declined to an average of 41.6 cents for 1957. The "high" of $1.296 a barrel was posted in February 1957 and the "low" of 26.5 cents in August.

TABLE 67.—Sales of residual fuel oil[1] in the United States, 1953–57, by uses

(Thousand barrels)

Use	1953	1954	1955	1956	1957	Change (percent)
Railroads	28,477	16,122	15,018	10,575	6,953	−34.3
Vessels (including tankers)	114,324	108,790	115,128	117,445	123,651	5.3
Gas and electric powerplants	85,352	70,749	75,966	73,962	75,950	2.7
Smelters, mines, and manufacturing industries	166,748	160,121	173,030	177,807	166,885	−6.1
Heating oils	81,824	78,845	86,282	87,601	81,412	−7.1
U. S. Army, Navy, Air Force, and Coast Guard	30,435	26,887	28,368	30,546	28,962	−5.2
Oil-company fuel	51,243	52,165	53,387	53,271	50,153	−5.9
Miscellaneous uses	6,326	7,035	9,804	10,331	9,984	−3.4
Total United States	564,729	520,714	556,983	561,538	543,950	−3.1

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[1] Includes Navy grade and crude oil burned as fuel.

TABLE 68.—Sales of residual fuel oil[1] in the United States, 1953–57, by districts and States

(Thousand barrels)

District[2] and State	1953	1954	1955	1956	1957
District 1:					
Connecticut	14, 377	12, 897	13, 108	13, 219	12, 712
Delaware	2, 558	2, 228	2, 907	2, 956	2, 973
District of Columbia	2, 035	1, 963	2, 152	2, 106	2, 501
Florida	27, 343	28, 909	32, 236	34, 910	36, 228
Georgia	6, 573	5, 590	6, 118	5, 955	6, 128
Maine	4, 228	3, 481	4, 443	4, 872	5, 063
Maryland	15, 323	14, 031	15, 466	15, 770	15, 364
Massachusetts	32, 763	30, 500	30, 496	29, 574	28, 744
New Hampshire	2, 467	2, 129	2, 377	2, 107	2, 096
New Jersey	47, 667	43, 339	46, 154	44, 587	45, 136
New York	53, 437	50, 809	51, 912	51, 737	51, 168
North Carolina	1, 439	1, 809	2, 377	2, 558	2, 467
Pennsylvania	42, 951	42, 734	45, 176	45, 325	44, 482
Rhode Island	10, 993	9, 473	11, 215	11, 303	11, 114
South Carolina	5, 332	3, 985	4, 291	4, 389	4, 383
Vermont	475	409	424	402	380
Virginia	15, 523	12, 998	16, 556	17, 452	17, 739
West Virginia	1, 526	1, 269	1, 355	1, 317	1, 321
Total	287, 010	268, 553	288, 763	290, 539	289, 999
District 2:					
Illinois	20, 823	20, 499	22, 227	22, 571	21, 375
Indiana	17, 679	14, 234	14, 588	15, 206	14, 753
Iowa	1, 051	884	994	1, 165	1, 125
Kansas	5, 247	4, 020	4, 179	3, 827	3, 586
Kentucky	913	949	1, 013	1, 062	1, 051
Michigan	14, 809	14, 675	15, 387	16, 008	15, 330
Minnesota	2, 370	2, 352	2, 700	2, 987	2, 955
Missouri	5, 140	4, 837	5, 863	6, 126	5, 758
Nebraska	351	313	363	377	375
North Dakota	124	179	515	870	783
Ohio	18, 698	18, 118	18, 915	19, 260	18, 530
Oklahoma	2, 351	1, 479	1, 783	1, 857	1, 740
South Dakota	232	165	176	211	217
Tennessee	1, 257	652	930	879	865
Wisconsin	2, 118	2, 109	2, 168	2, 290	2, 201
Total	93, 163	85, 465	91, 801	94, 696	90, 644
District 3:					
Alabama	3, 873	3, 123	3, 907	4, 162	4, 203
Arkansas	1, 006	415	419	545	549
Louisiana	9, 929	9, 710	10, 601	10, 804	11, 359
Mississippi	163	160	179	219	232
New Mexico	696	262	283	505	438
Texas	41, 978	36, 312	38, 108	37, 883	37, 859
Total	57, 645	49, 982	53, 497	54, 118	54, 640
District 4:					
Colorado	1, 124	1, 326	1, 363	1, 434	1, 369
Idaho	1, 067	1, 115	1, 421	1, 256	1, 185
Montana	3, 276	1, 751	1, 692	1, 646	1, 554
Utah	5, 044	4, 321	4, 392	4, 478	4, 201
Wyoming	2, 762	2, 076	2, 118	2, 156	1, 847
Total	13, 273	10, 589	10, 986	10, 970	10, 156
District 5:					
Arizona	206	45	61	35	21
California	85, 870	79, 973	83, 959	84, 421	79, 245
Nevada	2, 048	1, 353	1, 359	383	269
Oregon	11, 186	9, 776	10, 152	9, 401	7, 181
Washington	14, 328	14, 978	16, 405	16, 975	11, 795
Total	113, 638	106, 125	111, 936	111, 215	98, 511
Total United States	564, 729	520, 714	556, 983	561, 538	543, 950

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[1] Includes some crude oil burned as fuel.

[2] States are grouped according to petroleum-marketing districts rather than conventional geographic regions.

TABLE 69.—Monthly average prices of residual fuel oil in the United States, 1956–57, in dollars per barrel

[Platt's Oil Price Handbook]

Year and grade	January	February	March	April	May	June	July	August	September	October	November	December	Average for year
1956													
No. 6 fuel oil at refineries, Oklahoma	2.14	2.15	2.12	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.14	2.39	2.14
No. 5 fuel oil at New York Harbor	3.17	3.18	3.18	3.18	3.18	3.22	3.30	3.30	3.30	3.30	3.42	3.53	3.27
Bunker "C" for ships:													
New York	2.65	2.65	2.65	2.65	2.65	2.69	2.80	2.80	2.80	2.80	2.93	3.05	2.76
New Orleans	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.30	2.48	2.23
San Pedro	2.08	2.11	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.33	2.50	2.18
1957													
No. 6 fuel oil at refineries, Oklahoma	2.60	2.64	2.52	2.48	2.48	2.41	2.26	2.10	2.03	1.90	1.80	1.80	2.25
No. 5 fuel oil at New York Harbor	3.69	3.83	3.83	3.81	3.67	3.64	3.63	3.52	3.48	3.48	3.48	3.45	3.63
Bunker "C" for ships:													
New York	3.23	3.35	3.35	3.33	3.14	3.11	3.09	2.99	2.95	2.95	2.95	2.95	3.12
New Orleans	2.63	2.75	2.75	2.75	2.75	2.76	2.80	2.80	2.74	2.65	2.65	2.65	2.72
San Pedro	2.63	2.80	2.80	2.81	2.88	2.88	2.90	2.90	2.88	2.85	2.85	2.85	2.83

LUBRICANTS

Demand for lubricating oil declined in 1957, as in 1956, because of the improved quality of motor-vehicle lubricants and smaller exports. Lubricants now marketed will withstand harder and longer use. Also more refiners abroad are installing lubricating-oil facilities to enable them to supply their own markets.

Demand for lubricants in 1957 totaled 55.0 million barrels, which included exports of 13.8 million barrels and a domestic demand of 41.2 million barrels. Compared with 1956, the total demand declined 4.8 percent, domestic demand 6.1 percent, and exports 0.5 percent.

Production of lubricants in 1957 was 3.5 million barrels less than in 1956. Production declined in all refining districts except the West Coast district.

TABLE 70.—Salient statistics of lubricants in the United States, 1956–57, by months and districts

Month and district	Production (thousand barrels)		Yield (percent)		Domestic demand (thousand barrels)		Stocks, end of period (thousad barrenls)	
	1956	1957 [1]	1956	1957 [1]	1956	1957 [1]	1956	1957 [1]
By months:								
January	4,985	4,960	2.0	1.9	3,511	3,774	9,167	10,412
February	4,536	4,334	1.9	1.9	3,420	3,382	9,309	10,308
March	4,996	4,858	2.1	2.0	3,478	3,374	9,646	10,428
April	5,108	5,124	2.3	2.2	3,763	3,653	9,725	10,587
May	5,164	5,131	2.1	2.1	3,978	3,869	9,542	10,710
June	5,010	4,246	2.1	1.8	3,604	3,037	9,754	10,591
July	4,749	4,657	1.9	1.9	3,717	3,897	9,694	10,313
August	5,005	4,704	2.0	1.9	3,858	3,717	9,547	10,124
September	4,706	4,378	2.0	1.8	3,492	3,169	9,664	10,210
October	5,112	4,476	2.1	1.9	4,152	3,621	9,536	9,953
November	4,970	4,423	2.1	1.9	3,473	2,881	10,060	10,396
December	4,870	4,432	1.9	1.8	3,487	2,872	10,182	10,864
Total	59,211	55,723	2.0	1.9	43,933	41,246	10,182	10,864
By districts:								
East Coast	8,911	8,210	2.1	1.8	(2)	(2)	2,288	2,306
Appalachian	4,897	4,408	6.7	5.2			725	1,029
Indiana, Illinois, Kentucky, etc.	5,193	4,453	1.0	.6			1,255	1,193
Oklahoma, Kansas, etc	4,859	4,856	1.9	1.4			556	688
Texas Inland	65	16	.1	--------			4	1
Texas Gulf Coast	21,929	20,992	3.1	3.1			3,692	3,903
Louisiana Gulf Coast	6,295	5,764	2.4	2.4			897	918
Arkansas, Louisiana Inland, etc.	1,852	1,630	5.3	4.4			97	187
Rocky Mountain	199	173	.2	.3			86	98
West Coast	5,011	5,221	1.2	1.3			582	541
Total	59,211	55,723	2.0	1.9	--------	--------	10,182	10,864

[1] Preliminary figures.
[2] Figures not available.

TABLE 71.—Average monthly refinery prices of five selected grades of lubricating oil in the United States, 1956–57, in cents per gallon

[Platt's Oil Price Handbook]

Year and grade	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for year
1956													
Oklahoma:													
200 viscosity, No. 3 color, neutral	16.25	16.25	17.09	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.07
150–160 viscosity at 210° bright stock, 10–25 pour test	20.50	20.50	21.34	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.50	21.32
Pennsylvania:													
200 viscosity, No. 3 color, neutral 420–425 flash, 25 pour test	20.26	20.50	20.66	21.00	21.52	22.82	23.60	24.87	25.00	25.00	25.00	25.00	22.94
600 steam-refined, cylinder stock, filterable	15.79	16.36	16.96	17.75	18.63	19.50	19.87	20.50	20.50	20.50	20.50	20.50	18.95
South Texas: 500 viscosity, No. 2½–3½ color, neutral	14.75	14.75	14.75	14.75	14.75	14.75	14.75	15.22	15.75	15.75	15.75	15.75	15.12
1957													
Oklahoma:													
200 viscosity, No. 3 color, neutral	18.17	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.75	18.57	18.70
150–160 viscosity at 210° bright stock, 10–25 pour test	22.52	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	22.96
Pennsylvania:													
200 viscosity, No. 3 color, neutral 420–425 flash, 25 pour test	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
600 steam-refined, cylinder stock, filterable	20.55	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	20.98	19.81	20.86
South Texas: 500 viscosity, No. 2½–3½ color, neutral	17.09	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	17.92

JET FUELS

Jet fuel is a blend of gasoline, kerosine, and distillate fuel oils. At present, it is used principally for military aircraft or for engine testing by aircraft manufacturers. Commercial planes with turboprop engines use kerosine for fuel. In 1957 the quantity of low-grade gasoline blended for jet-fuel use declined sharply, but the quantities of blended kerosine and distillate fuel oil increased. The total production of 63.3 million barrels of jet fuels in 1957 contained 72.7 percent gasoline, 19.8 percent kerosine, and 7.5 percent distillate fuel oil. Gasoline comprised 77.5 percent of the 1956 output of jet fuel.

The demand for jet fuel declined 1 million barrels in 1957; production was 3.1 million barrels lower; imports dropped from 7.8 million barrels in 1956 to 7.4 million barrels in 1957; and stocks were reduced 0.6 million barrels during the year.

LIQUEFIED GASES

Liquefied gases are derived from two sources. Those produced at refineries are called liquefied refinery gases to distinguish them from those extracted from natural gas, which are called liquefied petroleum gases. The liquefied petroleum gases are all saturated (that is, propane, butane, etc.). The liquefied refinery gases may contain unsaturated compounds or olefins (that is, propylene, butylene, etc.). The olefins are used as feed stock for chemical plants. The saturated gases may be used as chemical raw material or as fuel. Liquefied gases are also used in producing gasoline and are reported in this chapter as natural-gas liquids used at refineries or as gasoline.

The demand for liquefied gases in 1957 was 1.5 percent higher than in 1956. Production by petroleum refineries totaled 53.4 million barrels compared with 52.0 million in 1956.

More detailed information on liquefied gases may be found in the Natural-Gas Liquids chapter.

OTHER PRODUCTS

Wax.—Total demand for wax in 1957 was 5.5 million barrels, including exports of 1.0 million barrels and a domestic demand of 4.5 million barrels. Wax is used primarily for waterproofing paper products and for candles. The petroleum industry supplies about 94 percent of the total output of wax.

Coke.—All coke produced at refineries is not marketable. Coke forms on the catalyst in cracking operations and must be burned off at the plant. The heat generated in burning it is used as refinery fuel. Coke produced at thermal cracking units is recoverable and is marketed. Much of this coke is made into electrodes that are used in the electrolytic production of aluminum.

The demand for petroleum coke has increased almost 86 percent since 1950. Refiners are continuing to install facilities for cracking the heavier fuel oils, which are less profitable, to obtain a higher yield of gasoline and a coke of better quality, which have a more ready market. Refineries used 15.1 million barrels of petroleum coke as refinery fuel in 1957, including 14.2 million barrels of nonmarketable catalyst coke.

TABLE 72.—Salient statistics of jet fuel in the United States, 1956–57, by months and districts

(Thousand barrels)

	Production								Domestic demand		Imports		Exports		Stocks, end of year	
	Blended from—				Blended from—											
	Gasoline	Kerosine	Distillate	Total	Gasoline	Kerosine	Distillate	Total	1956	1957[1]	1956	1957[1]	1956	1957[1]	1956	1957
	1956				1957											
By months:																
January	3,536	716	242	4,494	4,785	1,031	391	6,207	3,993	6,552	123	290	--------	82	4,081	5,185
February	4,019	742	292	5,053	4,344	1,100	386	5,830	5,072	6,766	86	1,086	--------	9	4,148	5,326
March	4,464	948	340	5,752	5,005	1,275	520	6,800	6,280	7,941	716	683	--------	--------	4,336	4,868
April	3,873	753	335	4,961	4,507	1,247	449	6,203	5,311	6,478	194	730	2	1	4,178	5,322
May	4,843	1,003	337	6,183	4,043	1,388	382	5,813	6,462	6,120	780	641	15	--------	4,664	5,656
June	4,421	882	312	5,615	2,978	1,113	321	4,412	6,543	4,333	636	588	--------	2	4,372	6,321
July	4,292	1,015	361	5,668	3,909	1,228	377	5,514	6,438	7,122	488	759	--------	2	4,090	5,470
August	4,642	970	278	5,890	4,003	909	348	5,260	6,730	5,832	1,325	352	1	2	4,574	5,248
September	4,471	1,054	336	5,861	2,752	666	284	3,702	7,351	4,064	1,619	157	66	1	4,637	5,042
October	4,407	889	323	5,619	3,397	925	401	4,723	6,985	5,296	1,153	223	--------	11	4,424	4,681
November	3,926	979	411	5,316	2,971	905	369	4,245	5,686	5,932	524	1,656	2	5	4,576	4,645
December	4,578	1,173	280	6,031	3,313	785	515	4,613	5,304	4,713	119	208	100	4	5,322	4,749
Total	51,472	11,124	3,847	66,443	46,007	12,572	4,743	63,322	72,155	71,149	7,763	7,373	186	119	5,322	4,749
By districts:																
East Coast	2,541	277	99	2,917	1,691	107	53	1,851							571	304
Appalachian	1,650	114	--------	1,764	1,038	--------	--------	1,038							163	24
Indiana, Illinois, Kentucky, etc.	4,524	488	65	5,077	4,499	493	132	5,124							505	569
Minnesota, Wisconsin, North and South Dakota	376	12	--------	388	424	--------	--------	424							48	34
Oklahoma, Kansas, Missouri, etc.	7,632	1,952	1,359	10,943	7,249	1,755	1,856	10,860							752	535
Texas Inland	4,299	14	159	4,472	4,629	93	423	5,145	(2)	(2)	(2)	(2)	(2)	(2)	310	414
Texas Gulf Coast	10,438	3,001	52	13,491	8,091	5,110	197	13,398							1,145	845
Louisiana Gulf Coast	5,380	1,408	79	6,867	3,258	750	--------	4,008							392	305
Arkansas, Louisiana Inland, etc.	385	29	--------	414	507	63	--------	570							19	31
New Mexico	954	--------	--------	954	984	--------	--------	984							71	98
Rocky Mountain	2,048	336	388	2,772	2,344	614	385	3,343							253	323
West Coast	11,245	3,493	1,646	16,384	11,293	3,587	1,697	16,577							1,093	1,267
Total	51,472	11,124	3,847	66,443	46,007	12,572	4,743	63,322	--------	--------	--------	--------	--------	--------	5,322	4,749

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[1] Preliminary figures.
[2] Figures not available.

TABLE 73.—Salient statistics of wax in the United States, 1956–57, by types, months, and districts

(Thousand barrels) [1]

	Production						Domestic demand (all types)		Exports (all types)		Stocks, end of period					
	1956			1957 [2]							1956			1957 [2]		
	Micro-crys-talline	Fully refined	Other	Micro-crys-talline	Fully refined	Other	1956	1957 [2]	1956	1957 [2]	Micro-crys-talline	Fully refined	Other	Micro-crys-talline	Fully refined	Other
By months:																
January	56	217	171	91	203	166	376	375	81	82	92	238	208	104	288	269
February	48	261	135	109	157	110	340	337	76	68	89	258	219	103	266	263
March	56	278	145	92	241	166	442	404	86	57	79	235	203	115	286	269
April	49	258	81	62	224	187	322	359	81	77	84	251	167	108	295	304
May	54	262	169	62	266	140	362	392	75	77	93	276	181	105	311	290
June	57	219	172	47	227	147	370	325	62	74	97	282	187	99	332	306
July	50	198	151	58	215	173	333	374	66	94	97	267	202	109	300	297
August	54	246	166	53	231	146	380	368	75	110	105	265	207	106	294	258
September	102	190	149	53	221	188	341	367	69	91	109	278	221	103	285	274
October	100	200	150	64	270	164	370	412	83	93	107	265	233	102	295	258
November	95	201	150	47	245	158	376	368	64	82	118	255	238	95	297	263
December	112	213	152	75	240	163	328	397	102	70	118	287	253	104	345	217
Total	833	2,743	1,791	813	2,740	1,908	4,340	4,478	920	975	118	287	253	104	345	217
By districts:																
East Coast	414	1,048	373	407	955	443	(3)	(3)	(3)	(3)	35	67	29	30	84	29
Appalachian	12	96	332	23	94	261					20	37	14	13	35	16
Indiana, Illinois, Kentucky, etc.	17	184	31	16	176	61					1	11	26	1	12	10
Oklahoma, Kansas, etc	205	136	182	223	93	251					27	4	16	45	6	26
Texas Inland	43			11		23					4					2
Texas Gulf Coast	102	689	283	85	841	285					26	32	103	9	54	87
Louisiana Gulf Coast	38	58	576	43	84	568					4	11	50	3	14	35
Rocky Mountain	2	61	14	5	34	16					1	10	15	3	5	12
West Coast		471			463							115			135	
Total	833	2,743	1,791	813	2,740	1,908	4,340	4,478	920	975	118	287	253	104	345	217

[1] Conversion factor: 280 pounds to the barrel.
[2] Preliminary figures.
[3] Figures not available.

TABLE 74.—Average monthly refinery prices of 124°–126° white crude scale wax at Pennsylvania refineries, 1953–57, in cents per pound

[Platt's Oil Price Handbook]

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average for year
1953	3.81	3.81	3.90	4.34	4.56	4.85	5.00	5.00	5.00	5.00	5.00	5.00	4.61
1954	5.00	5.00	5.05	5.13	5.16	5.44	5.45	5.45	5.45	5.45	5.45	5.45	5.29
1955	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.45	5.68	5.47
1956	5.91	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.03	6.25	6.02
1957	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25	6.25

TABLE 75.—Salient statistics of petroleum coke in the United States, 1956–57, by months and districts [1]

Month and district	Production (thousand barrels)		Yield (percent)		Domestic demand (thousand barrels)		Stocks, end of period (thousand barrels)	
	1956	1957 [2]	1956	1957 [2]	1956	1957 [2]	1956	1957 [3]
By months:								
January	2,657	2,859	1.1	1.1	2,229	2,316	1,607	1,461
February	2,497	2,539	1.1	1.1	1,952	1,978	1,666	1,686
March	2,616	2,573	1.1	1.1	2,194	2,038	1,720	1,847
April	2,268	2,604	1.0	1.1	1,686	2,151	1,734	1,723
May	2,477	2,962	1.0	1.2	1,846	2,356	1,719	1,858
June	2,689	2,795	1.1	1.2	2,269	2,253	1,712	1,972
July	2,759	2,597	1.1	1.1	2,152	2,012	1,777	2,001
August	2,674	2,812	1.1	1.1	2,018	2,521	1,704	2,006
September	2,593	2,765	1.1	1.2	2,005	2,092	1,681	2,175
October	2,523	2,997	1.0	1.3	1,936	2,398	1,540	2,296
November	2,596	2,928	1.1	1.3	2,002	2,194	1,558	2,504
December	2,746	3,035	1.1	1.2	2,588	2,717	1,319	2,534
Total	[3] 31,095	[4] 33,466	1.1	1.2	24,877	27,026	1,319	2,534
By districts:								
East Coast	1,977	3,579	.5	.9	(5)	(5)	31	301
Appalachian	445	476	1.1	1.3			-------	-------
Indiana, Illinois, Kentucky, etc.	10,585	10,681	2.1	2.0			288	523
Minnesota, Wisconsin, etc.	1,078	1,271	3.4	3.9			143	157
Oklahoma, Kansas, etc.	5,096	5,478	2.0	2.1			68	176
Texas Inland	708	438	.7	.4			55	30
Texas Gulf Coast	2,856	2,702	.4	.4			-------	-------
Louisiana Gulf Coast	2,853	2,883	1.1	1.5			7	54
Arkansas, Louisiana Inland, etc.	822	691	2.4	1.9			27	24
Rocky Mountain	1,294	1,494	1.3	1.8			70	196
West Coast	3,381	3,773	.8	1.0			630	1,073
Total	[3] 31,095	[4] 33,466	1.1	1.2			1,319	2,534

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[1] Conversion factor: 5.0 barrels to the short ton.

[2] Preliminary figures.

[3] Includes 13,746 thousand barrels of nonmarketable catalyst coke.

[4] Includes 14,173 thousand barrels of nonmarketable catalyst coke.

[5] Figures not available.

Still Gas.—The production of still gas increased from 122.0 million barrels in 1956 to 125.7 million in 1957 or from 648 billion to 686 billion cubic feet. The conversion from cubic feet to barrels is in terms of the crude-oil equivalent to balance the refinery input and output and is not based on heating value. Most still gas is consumed as refinery fuel.

TABLE 76.—Production of still gas in the United States, 1955–57, by districts[1]

District	1955		1956		1957[2]	
	Million cubic feet	Equivalent in thousand barrels	Million cubic feet	Equivalent in thousand barrels	Million cubic feet	Equivalent in thousand barrels
East Coast	72,093	14,080	73,636	14,269	76,771	14,754
Appalachian	14,889	3,848	16,835	3,997	17,910	3,884
Indiana, Illinois, Kentucky, etc	118,306	24,506	128,691	25,479	144,104	26,872
Minnesota, Wisconsin, North Dakota, and South Dakota	(3)	(3)	3,952	868	6,044	1,093
Oklahoma, Kansas, etc	40,179	8,890	48,051	9,648	59,529	11,187
Texas Inland	23,498	5,031	27,337	5,529	27,483	5,244
Texas Gulf Coast	154,141	28,153	169,209	29,357	158,710	26,947
Louisiana Gulf Coast	48,353	9,147	51,783	9,105	56,965	10,129
Arkansas, Louisiana Inland, etc	5,798	1,337	5,709	1,192	5,223	1,290
New Mexico	(4)	[5] 67	(4)	[5] 134	(4)	[5] 216
Rocky Mountain	17,433	3,668	20,065	4,106	23,478	4,676
West Coast	98,137	17,779	102,277	18,309	109,617	19,428
Total	592,827	116,506	647,545	121,993	685,834	125,720

[1] Conversion factor: 3,600 cubic feet to the barrel.
[2] Preliminary figures.
[3] Formerly included with Indiana, Illinois, Kentucky, etc.
[4] Included with Rocky Mountain.
[5] Formerly included with Rocky Mountain.

Asphalt and Road Oil.—The slowdown in the building program and delays in planned road construction resulted in a decline in domestic demand for asphalt in 1957. This decrease of 2.1 percent was the first decline reported in several years. Sales of road oil were 11.9 percent less than 1956.

Sales of asphalt and road oil by States and uses are shown in the Petroleum Asphalt chapter of the Minerals Yearbook.

Miscellaneous Oils.—Included in this category are petrolatum, medicinal oils, absorption oils, solvents, specialty oils, and other oils. The latter two products usually are called petrochemicals. Domestic demand for miscellaneous oils increased 20 percent in 1957, and most of the gain was in demand for petrochemical products.

Unfinished Oils.—Unfinished oils include all oils requiring cracking or further distillation, except the unfinished gasoline portion of naphtha distillate. Unfinished oils ordinarily are rerun and become finished products.

TABLE 77.—Production of miscellaneous finished oils in the United States in 1957, by districts and classes

(Thousand barrels)

District	Petrolatum	Medicinal oil	Absorption oil	Specialties oil	Solvents	Other	Total[1]
East Coast		35		2,301	146	101	2,583
Appalachian	133			60		1	194
Indiana, Illinois, Kentucky, etc	36		16	936	398	327	1,713
Minnesota, Wisconsin, North and South Dakota						50	50
Oklahoma, Kansas, etc	193		147	616		5	961
Texas Inland			970	58		424	1,452
Texas Gulf Coast	90		99	820		2,529	3,538
Louisiana Gulf Coast	3		212	2,089	28	1	2,333
Arkansas-Louisiana Inland			744		46	16	806
Rocky Mountain and New Mexico			11	34	1	167	213
West Coast			16	724	206	3,070	4,016
Total	455	35	2,215	7,638	825	6,691	17,859

[1] Conversion factor: 300 pounds to the barrel.

INTERCOASTAL SHIPMENTS

Shipments of crude oil and products from Gulf-coast ports to east-coast ports comprise the bulk of intercoastal shipments. Some petroleum products are shipped from the Gulf coast to the west coast and from the west coast to the east coast, but the volume of these shipments is small.

Crude-oil shipments from Gulf-coast to east-coast ports were 13.2 percent higher than in 1956, but shipments of all products were below the 1956 level. Shipments from the Gulf coast to the east coast in 1957 totaled 690 million barrels compared with 711 million barrels in 1956.

TABLE 78.—Petroleum oils, crude and refined, shipped commercially from Gulf-coast to east-coast ports of the United States, 1956–57, by classes [1]

(Thousand barrels)

Year and class	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1956													
Crude petroleum	15, 019	15, 362	15, 074	12, 421	11, 223	11, 965	12, 961	14, 424	13, 363	13, 686	15, 330	17, 965	168, 793
Gasoline	16, 123	17, 012	20, 904	18, 816	21, 770	19, 765	20, 738	21, 097	18, 491	18, 546	17, 677	16, 999	227, 938
Kerosine	5, 726	4, 668	3, 376	3, 006	2, 709	2, 899	3, 464	3, 528	3, 437	4, 361	3, 502	4, 947	45, 623
Distillate fuel oil	24, 037	21, 712	16, 410	13, 470	12, 641	12, 558	13, 798	14, 509	13, 576	16, 089	14, 800	18, 106	191, 706
Residual fuel oil	5, 497	5, 285	5, 513	4, 084	5, 159	4, 823	4, 233	4, 945	3, 741	4, 290	4, 098	4, 060	55, 728
Lubricating oils	767	945	717	797	722	678	731	552	707	832	641	660	8, 749
Miscellaneous oils	1, 233	1, 007	1, 099	604	1, 343	874	778	627	1, 110	1, 201	1, 440	914	12, 230
Total	68, 402	65, 991	63, 093	53, 198	55, 567	53, 562	56, 703	59, 682	54, 425	59, 005	57, 488	63, 651	710, 767
1957													
Crude petroleum	21, 407	18, 270	19, 763	18, 555	15, 117	13, 558	12, 546	12, 549	13, 948	13, 833	15, 446	16, 135	191, 127
Gasoline	17, 252	15, 151	19, 503	18, 637	19, 459	19, 208	19, 683	21, 573	19, 010	19, 467	19, 266	16, 811	225, 020
Kerosine	4, 754	3, 559	3, 127	2, 598	2, 213	2, 017	3, 026	3, 313	2, 589	3, 345	4, 344	4, 708	39, 593
Distillate fuel oil	19, 016	14, 854	14, 769	11, 926	12, 226	11, 127	12, 820	11, 731	11, 985	12, 678	15, 794	17, 993	166, 919
Residual fuel oil	4, 053	4, 604	3, 965	3, 823	3, 583	3, 305	3, 166	3, 682	4, 919	4, 643	4, 216	5, 108	49, 067
Lubricating oils	710	731	689	706	658	572	675	661	605	786	586	541	7, 920
Miscellaneous oils	509	681	1, 149	1, 564	907	835	1, 038	705	837	768	571	613	10, 177
Total	67, 701	57, 850	62, 965	57, 809	54, 163	50, 622	52, 954	54, 214	53, 893	55, 520	60, 223	61, 909	689, 823

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[1] Office of Oil and Gas, U. S. Department of the Interior.

FOREIGN TRADE

Foreign-trade statistics in this section, as reported by the United States Department of Commerce, differ slightly from those used in other sections of this chapter. Bureau of Mines statistics on petroleum imports pertain to continental United States only, and its export statistics include not only foreign countries but also shipments to Territories. Imports of crude petroleum and unfinished oils (table 78) are obtained by the Bureau of Mines from petroleum companies to balance refinery reports, therefore they differ from the totals reported by the United States Department of Commerce.

Imports.—Petroleum imports into continental United States increased 9.0 percent in 1957 and represented 16.4 percent of the total supply compared with 15.3 percent in 1956.

In July 1957, a special cabinet committee, established by the President, recommended to him that imports of crude oil had reached a level that threatened national security and that a program be established to limit crude-oil imports. Under the Voluntary Oil Import Program, each importer of crude oil was granted an allocation based on his previous import record, and provisions were made for allocations to new importers. Imports of crude oil on the west coast were not included in the restrictions, but early in 1958 the program was expanded to cover the entire United States. Because of contract and transportation commitments only slight reductions were effected in crude-oil imports in the last quarter of 1957.

Net imports (imports minus exports) into the continental United States averaged 1,009,000 barrels daily in 1957 compared with 1,006,000 in 1956. The gain in 1957 was small compared with that in several preceding years owing to the 33-percent increase in exports as a result of shipping petroleum to Europe during the Suez crisis. Crude oil accounted for 65 percent of the total oil imported in 1957 and residual fuel oil for 30 percent of the total.

According to the United States Department of Commerce, crude-oil imports averaged 1,022,000 barrels daily in 1957 compared with 944,000 barrels daily in 1956. Venezuela supplied 52 percent of the total.

Imports of residual fuel oil averaged 475,000 barrels daily in 1957, or 6 percent more than in 1956. Most of the residual-fuel-oil imports were of Venezuelan or Netherland Antilles origin.

Exports.—Emergency shipments of crude petroleum and petroleum products to Europe, which began in November 1956, continued through May 1957, when the Suez Canal was reopened. As a result, exports for 1957 averaged 562,000 barrels daily compared with 430,000 barrels daily in 1956. Exports for the first 6 months of 1957 averaged 766,000 barrels daily.

TABLE 79.—Petroleum oils, crude and refined, imported into continental United States, 1956–57, by months [1]

(Thousand barrels)

Year and class	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1956													
Crude petroleum	24,944	24,584	28,942	24,462	29,074	29,606	33,593	31,029	31,281	31,123	26,124	27,071	341,833
Refined products:													
Gasoline (excludes jet)	11	111	84	4	139	439	338	187	76	235	31	27	1,682
Kerosine									9		1		10
Distillate fuel oil	383	455	599	387	391	423	441	390	405	518	372	395	5,159
Residual fuel oil	18,218	15,729	13,608	14,146	13,637	11,469	10,151	10,399	9,899	14,817	13,415	17,381	162,869
Jet fuel [2]	123	86	716	194	780	636	488	1,325	1,619	1,153	524	119	7,763
Asphalt	191	117	238	236	282	226	364	522	477	409	237	307	3,606
Unfinished oils	156	107	80	193	109	213	253	317	455	279	244	263	2,669
Total	44,026	41,189	44,267	39,622	44,412	43,012	45,628	44,169	44,221	48,534	40,948	45,563	525,591
1957 [3]													
Crude petroleum	25,255	22,119	26,320	27,716	33,159	35,045	37,736	40,275	32,161	32,718	28,225	32,526	373,255
Refined products:													
Gasoline (excludes jet)	161	84	141	251	6	136	141	483	585	254	282	381	2,905
Kerosine	30												30
Distillate fuel oil	570	723	887	634	510	444	537	1,042	822	1,014	592	752	8,527
Residual fuel oil	17,557	16,186	17,421	16,711	14,264	12,045	11,088	11,134	10,083	13,318	14,101	19,293	173,201
Jet fuel [2]	290	1,086	683	730	641	588	759	352	157	223	1,656	208	7,373
Asphalt	583	75	298	716	433	551	515	573	651	803	726	983	6,907
Unfinished oils	52	42	62	17	156				196	3	215	214	957
Total	44,498	40,315	45,812	46,775	49,169	48,809	50,776	53,859	44,655	48,333	45,797	54,357	573,155

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[1] Imports of crude reported to the Bureau of Mines; imports of refined products compiled from records of U. S. Department of Commerce.

[2] Formerly included with gasoline.

[3] Preliminary figures.

TABLE 80.—Crude petroleum and petroleum products imported for consumption into continental United States, 1956–57, by country, in thousand barrels [1]

[Bureau of the Census]

Country	Crude petroleum	Gasoline [2]	Kerosine	Distillate oil [3]	Residual oil [3]	Asphalt	Unfinished oil	Miscellaneous oils [4]	Total
1956									
North America:									
Canada	43,227	1,584	1	95	602	6	-------	(5)	45,515
Mexico	6,094	-------	-------	(5)	16,042	-------	81	(5)	22,217
Netherland Antilles	791	6,676	230	4,726	[6] 86,106	2,875	-------	(5)	[6] 101,404
Trinidad and Tobago	431	406	-------	-------	572	14	280	-------	1,703
Other North America	-------	-------	-------	-------	-------	1	-------	-------	1
Total	50,543	8,666	231	4,821	[6] 103,322	2,896	361	(5)	[6] 170,840
South America:									
Colombia	9,176	-------	-------	-------	2	-------	-------	-------	9,178
Ecuador	431	-------	-------	-------	-------	-------	-------	-------	431
Peru	614	-------	-------	-------	-------	-------	-------	-------	614
Venezuela	177,199	645	-------	513	60,735	728	3,675	-------	243,495
Other South America	(5)	-------	-------	-------	-------	(5)	(5)	-------	(5)
Total	187,420	645	-------	513	60,737	728	3,675	-------	253,718
Europe:									
Germany, West	-------	(5)	(5)	38	-------	-------	-------	(5)	38
Other Europe	-------	(5)	-------	-------	-------	1	-------	(5)	1
Total	-------	(5)	(5)	38	-------	1	-------	(5)	39
Asia:									
Bahrein	-------	-------	-------	-------	614	-------	525	-------	1,139
Indonesia	13,213	-------	-------	-------	-------	-------	-------	-------	13,213
Iran	6,156	-------	-------	-------	-------	-------	-------	-------	6,156
Iraq	9,880	-------	-------	-------	-------	-------	-------	-------	9,880
Kuwait	52,298	-------	-------	-------	-------	-------	-------	-------	52,298
Qatar [7]	5,995	-------	-------	-------	-------	-------	-------	-------	5,995
Saudi Arabia	29,222	-------	(5)	199	1,083	-------	-------	-------	30,504
Total	116,764	-------	(5)	199	1,697	-------	525	-------	119,185
Oceania: Australia	(5)	-------	-------	1	-------	-------	-------	-------	1
Grand total	354,727	9,311	231	5,572	[6] 165,756	3,625	4,561	(5)	[6] 543,783
Shipments from noncontiguous Territories and possessions to continental United States:									
Puerto Rico [8]	-------	703	9	-------	521	-------	-------	-------	1,233
Imports into United States Territories and possessions from foreign countries:									
Alaska	-------	418	-------	-------	-------	-------	-------	-------	418
Hawaii	-------	136	-------	199	1,199	-------	-------	-------	1,534
Puerto Rico	9,257	273	230	212	2,214	18	759	(5)	12,963
Total	9,257	827	230	411	3,413	18	759	(5)	14,915
Total net imports into continental United States	345,470	[6] 9,187	[6] 10	5,161	[6] 162,864	3,607	3,802	(5)	[6] 530,101
1957									
North America:									
Canada	53,804	1,573	-------	635	772	(5)	9	(5)	56,793
Mexico	3,187	1	-------	294	10,929	-------	-------	-------	14,411
Netherland Antilles	369	8,347	119	5,134	84,312	3,535	-------	-------	101,816
Trinidad and Tobago	1,175	6	-------	233	1,799	19	260	-------	3,492
Other North America	130	-------	-------	(5)	495	-------	-------	-------	625
Total	58,665	9,927	119	6,296	98,307	3,554	269	(5)	177,137

See footnotes at the end of table.

TABLE 80.—Crude petroleum and petroleum products imported for consumption into continental United States, 1956–57, by country, in thousand barrels [1]—Con.

Country	Crude petroleum	Gasoline [2]	Kerosine	Distillate oil [3]	Residual oil [3]	Asphalt	Unfinished oil	Miscellaneous oils [4]	Total
South America:									
Colombia	8,491	--------	--------	--------	2	--------	--------	--------	8,493
Brazil	--------	--------	--------	--------	648	--------	--------	--------	648
Ecuador	454	--------	--------	--------	--------	--------	--------	--------	454
Venezuela	209,049	1,411	6	2,329	74,672	2,885	1,319	--------	291,671
Other South America	--------	--------	--------	--------	7	1	--------	--------	8
Total	217,994	1,411	6	2,329	75,329	2,886	1,319	--------	301,274
Europe:									
Netherlands	201	--------	--------	--------	124	(5)	--------	(5)	325
Other Europe	--------	16	--------	41	10	1	(5)	(5)	68
Total	201	16	--------	41	134	1	(5)	(5)	398
Asia:									
Bahrein	--------	129	--------	358	681	--------	--------	--------	1,168
Indonesia	24,226	--------	--------	--------	--------	--------	--------	--------	24,226
Iran	5,176	--------	--------	1	1	--------	--------	--------	5,178
Iraq	5,649	--------	--------	--------	--------	--------	--------	--------	5,649
Kuwait	59,446	--------	--------	--------	--------	--------	--------	--------	59,446
Qatar [7]	2,257	--------	--------	--------	--------	--------	--------	--------	2,257
Saudi Arabia	12,595	--------	--------	122	1,438	--------	--------	--------	14,155
Other Asia	--------	--------	--------	1	131	--------	--------	(5)	132
Total	109,349	129	--------	482	2,251	--------	--------	(5)	112,211
Grand total	386,209	11,483	125	9,148	176,021	6,441	1,588	(5)	591,015
Shipments from noncontiguous Territories and possessions to continental United States:									
Puerto Rico [8]	--------	1,446	--------	--------	454	--------	--------	--------	1,900
Imports into United States Territories and possessions from foreign countries:									
Alaska	--------	395	--------	--------	105	--------	--------	--------	500
Hawaii	--------	223	--------	480	1,051	--------	--------	--------	1,754
Puerto Rico	13,183	222	95	104	2,019	51	589	(5)	16,263
Total	13,183	840	95	584	3,175	51	589	(5)	18,517
Total net imports into continental United States	373,026	12,089	30	8,564	173,300	6,390	999	(5)	574,398

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[1] Compiled by Mae B. Price and Elsie D. Jackson, of the Bureau of Mines, from records of the Bureau of the Census, U. S. Department of Commerce.

[2] Includes naphtha but excludes benzol (thousand barrels: 1956—1,656; 1957—1,317).

[3] Includes quantities imported free for manufacture in bond and export and for supplies of vessels and aircraft.

[4] Includes quantities imported free for supplies of vessels and aircraft.

[5] Less than 1,000 barrels.

[6] Revised figure.

[7] Assumed source; classified in import statistics under "Arabia Peninsular States, n. e. c."

[8] As reported to the Bureau of Mines by shipping companies.

TABLE 81.—Petroleum oils, crude and refined, shipped from continental United States, including shipments to Territories and possessions, 1956–57, by classes and months [1]

(Thousand barrels)

Year and class	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1956													
Crude petroleum	994	501	1,155	610	1,236	857	748	1,179	805	1,444	8,551	10,544	28,624
Refined products:													
Gasoline [2]	2,784	1,617	2,861	2,759	2,638	2,635	3,291	2,898	3,251	2,833	3,294	4,711	35,572
Kerosine	222	66	148	189	335	239	255	112	123	356	581	671	3,297
Distillate fuel oil	1,694	1,849	1,754	2,621	1,551	1,958	1,885	2,420	2,387	2,868	5,391	8,157	34,535
Residual fuel oil	1,696	1,616	1,905	2,191	2,343	2,465	2,657	2,627	2,072	2,038	2,692	3,575	27,877
Jet fuel	-	-	-	2	15	-	-	1	66	-	2	100	186
Lubricants	1,070	974	1,181	1,266	1,369	1,194	1,092	1,294	1,097	1,088	973	1,261	13,859
Paraffin wax	81	76	86	81	75	62	66	75	69	83	64	102	920
Coke	345	486	368	568	646	427	542	729	611	728	576	397	6,423
Asphalt	70	257	148	137	97	51	252	91	79	113	89	129	1,513
Liquefied gases	443	337	355	271	288	332	382	418	297	460	337	354	4,274
Miscellaneous oils	22	26	22	28	27	21	19	31	25	26	21	38	306
Total refined	8,427	7,304	8,828	10,113	9,384	9,384	10,441	10,696	10,077	10,593	14,020	19,495	128,762
Total crude and refined	9,421	7,805	9,983	10,723	10,620	10,241	11,189	11,875	10,882	12,037	22,571	30,039	157,386
1957 [3]													
Crude petroleum	7,460	8,009	14,100	9,013	3,703	1,745	1,197	995	739	1,007	926	1,088	49,982
Refined products:													
Gasoline [2]	4,113	4,027	4,120	2,838	2,886	3,090	2,591	3,306	3,321	2,809	3,364	2,089	38,554
Kerosine	1,069	937	955	627	394	417	65	254	110	262	94	103	5,287
Distillate fuel oil	6,864	7,537	6,774	5,266	3,950	2,516	2,834	2,763	1,646	2,263	2,373	1,929	46,715
Residual fuel oil	4,287	3,979	3,963	4,007	3,411	3,193	3,159	2,997	1,979	2,505	2,129	2,182	37,791
Jet fuel	82	9	-	1	-	2	2	2	1	11	5	4	119
Lubricants	956	1,056	1,364	1,312	1,139	1,328	1,038	1,176	1,123	1,112	1,099	1,092	13,795
Paraffin wax	82	68	57	77	77	74	94	110	91	93	82	70	975
Coke	401	336	374	577	471	428	556	286	504	478	526	288	5,225
Asphalt	104	106	123	148	104	165	214	257	125	201	89	172	1,808
Liquefied gases	398	382	387	378	324	356	396	364	370	384	345	442	4,526
Miscellaneous oils	33	25	28	21	22	16	19	23	19	21	19	23	269
Total refined	18,389	18,462	18,145	15,252	12,778	11,585	10,968	11,538	9,289	10,139	10,125	8,394	155,064
Total crude and refined	25,849	26,471	32,245	24,265	16,481	13,330	12,165	12,533	10,028	11,146	11,051	9,482	205,046

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[1] Compiled from records of the U. S. Department of Commerce, except Alaska and Hawaii, which are Bureau of Mines data; figures may differ slightly from those used in other sections of this chapter.

[2] Includes benzol, naphtha, natural gasoline, and antiknock compounds.

[3] Preliminary figures.

TABLE 82.—Crude petroleum and petroleum products exported from continental United States, 1956–57, by country of destination and shipments to and exports from Territories and possessions, in thousand barrels [1]

[Bureau of the Census]

Country	Crude petroleum	Gasoline [2] [3]	Kerosine	Distillate oil	Residual oil	Lubricating oil [2]	Asphalt	Liquefied petroleum gases	Wax	Coke	Petrolatum	Miscellaneous products [2]	Total
1956													
North America:													
Canada	5,570	1,602	573	[4] 6,566	6,573	851	263	1,316	137	2,606	12	61	[4] 26,130
Cuba	3,262	105	2	344	1,673	92	17	200	31		1	16	5,743
El Salvador		214		14	110	6	11	22	6		(5)	3	386
Mexico		6,014	844	3,938	3,090	127	172	2,114	108		28	50	16,485
Netherland Antilles		2,857		2,976		36	1				(5)	(5)	5,870
Other North America		105	28	203	553	80	79	123	52	(5)	4	15	1,242
Total	8,832	10,897	1,447	[4] 14,041	11,999	1,192	543	3,775	334	2,606	45	145	[4] 55,856
South America:													
Argentina		(5)	473	739	323	297	5	25	2	31		2	1,897
Brazil		7	29	79	321	558	4	442	14	17	8	7	1,486
Chile		3	1	15	865	67	21	2	27		7	8	1,016
Colombia		3	(5)			35	25	4	156		2	9	234
Peru		12				16	(5)	(5)	15		1	6	50
Venezuela		61	(5)	(5)		58	5	2	28		2	27	183
Other South America		9	6	2		30	53	(5)	31	(5)	1	9	141
Total		95	509	835	1,509	1,061	113	475	273	48	21	68	5,007
Europe:													
Belgium-Luxembourg	1,020	199	1	673	402	735	3	(5)	12	735	7	10	3,797
France	[4] 6,896	483	2	378	485	65	(5)	1	40	296	7	4	[4] 8,657
Germany, West	2,151	61	3	206	263	312	(5)	(5)	19	319	11	7	3,352
Italy	1,038	251	(5)	57	216	118	1	3	10	216	10	43	1,963
Netherlands	1,824	143	117	2,463	198	302	(5)	1	26	56	9	14	5,153
Sweden	199	155	90	969	92	375	1	(5)	7	46	1	10	1,945
United Kingdom	5,238	489	282	[4] 7,163	1,412	1,308		1	57	51	67	1	[4] 16,069
Other Europe	249	243	59	1,008	306	498	43	1	32	605	6	20	3,070
Total	[4] 18,615	2,024	554	[4] 12,917	3,374	3,713	48	7	203	2,324	118	109	[4] 44,006

Asia:													
India	-----	7	1	-----	-----	527	14	-----	2	11	12	9	583
Japan-Nansei and Nanpo Islands	1,055	213	(5)	2,987	4,812	239	7	7	22	1,282	26	195	10,845
Malaya	-----	145	-----	-----	-----	68	10	-----	1	-----	4	4	232
Philippines	-----	14	(5)	41	-----	200	99	-----	22	-----	9	18	403
Turkey	-----	227	204	280	-----	206	-----	-----	1	-----	(5)	11	929
Other Asia	-----	62	75	148	60	428	196	2	37	76	36	50	1,170
Total	1,055	668	280	3,456	4,872	1,668	326	9	85	1,369	87	287	14,162
Africa:													
Belgian Congo	-----	6	1	-----	14	39	50	-----	(5)	-----	1	8	119
Egypt	-----	3	-----	-----	-----	168	-----	-----	(5)	-----	-----	4	175
French West Africa	-----	63	29	59	121	3	2	-----	-----	-----	-----	2	279
Union of South Africa	-----	56	(5)	6	-----	228	111	7	17	-----	23	27	475
Other Africa	122	97	45	507	249	104	82	(5)	1	-----	3	18	1,228
Total	122	225	75	572	384	542	245	7	18	-----	27	59	2,276
Oceania:													
Australia	-----	19	1	67	-----	635	(5)	(5)	5	29	6	1	763
French Pacific Islands	-----	22	8	38	9	(5)	1	(5)	-----	-----	-----	(5)	78
New Zealand	-----	13	1	-----	-----	102	18	1	2	-----	3	(5)	140
Other Oceania	-----	10	1	(5)	-----	-----	-----	-----	-----	-----	(5)	-----	11
Total	-----	64	11	105	9	737	19	1	7	29	9	1	992
Grand total	[4] 28,624	28,202	2,876	[4] 31,926	22,147	13,217	1,294	4,274	920	6,376	307	851	[4] 141,014
Shipments from continental United States to Territories and possessions:													
Alaska and Hawaii [6]	-----	5,247	139	2,667	6,276	129	80	-----	(7)	46	(7)	3	14,587
Puerto Rico	(7)	1,482	268	187	(7)	75	121	(7)	(7)	(7)	(7)	5	2,138
Wake	(7)	697	(5)	26	(7)	(5)	7	(7)	(7)	(7)	(7)	(5)	730
Other	(7)	99	15	72	(7)	9	12	(7)	(7)	(7)	(7)	(5)	207
Total	-----	7,525	422	2,952	6,276	2,128	220	-----	(7)	46	(7)	8	17,662
Exports from noncontiguous Territories and possessions to foreign countries:													
Alaska	-----	111	(5)	337	(5)	(5)	-----	-----	-----	-----	-----	1	449
Other	-----	25	2	2	791	(5)	(5)	3	-----	-----	(5)	-----	823
Total	-----	136	2	339	791	(5)	(5)	3	-----	-----	(5)	1	1,272
Total net shipments from continental United States	[4] 28,624	35,591	3,296	[4] 34,539	27,632	13,430	1,514	4,271	920	6,422	307	858	[4] 157,404

See footnotes at end of table.

TABLE 82.—Crude petroleum and petroleum products exported from continental United States, 1956–57, by country of destination, and shipments to and exports from Territories and possessions, in thousand barrels [1]—Continued

[Bureau of the Census]

Country	Crude petroleum	Gasoline [2] [3]	Kerosine	Distillate oil	Residual oil	Lubricating oil [2]	Asphalt	Liquefied petroleum gases	Wax	Coke	Petrolatum	Miscellaneous products [2]	Total
1957													
North America:													
Canada	8,240	1,696	437	5,236	5,918	1,026	198	1,340	131	2,225	13	87	26,547
Cuba	3,283	1,049	4	371	1,214	230	11	242	23	(5)	2	19	6,448
El Salvador	---	161	14	17	---	16	1	20	7	---	1	2	239
Mexico	902	5,494	1,306	3,080	3,069	136	332	2,313	161	1	10	48	16,852
Netherland Antilles	---	2,625	375	2,479	469	14	---	160	---	---	(5)	(5)	6,122
Other North America	---	253	28	529	283	265	33	126	56	---	6	15	1,594
Total	12,425	11,278	2,164	11,712	10,953	1,687	575	4,201	378	2,226	32	171	57,802
South America:													
Argentina	---	(5)	408	1,483	1,358	25	8	3	1	---	(5)	1	3,287
Brazil	---	55	71	150	---	1,062	1	271	45	25	11	3	1,694
Chile	---	4	(5)	20	767	131	38	(5)	33	---	1	10	1,004
Colombia	---	4	---	---	---	183	23	6	163	---	3	7	389
Peru	---	6	---	---	---	106	2	(5)	22	---	1	8	145
Venezuela	---	3	---	---	(5)	325	5	3	26	---	2	31	395
Other South America	---	7	3	5	19	112	11	(5)	27	---	(5)	12	196
Total	---	79	482	1,658	2,144	1,944	88	283	317	25	18	72	7,110
Europe:													
Belgium-Luxembourg	1,742	135	2	1,257	405	861	2	(5)	9	328	6	7	4,754
France	8,939	752	258	4,116	2,833	50	1	1	41	306	9	5	17,311
Germany, West	2,197	90	14	1,043	2,738	362	---	(5)	16	23	9	7	6,499
Italy	2,439	196	(5)	---	185	268	6	20	18	246	7	33	3,418
Netherlands	3,254	35	153	3,570	635	302	(5)	(5)	21	19	4	31	8,024
Sweden	674	626	139	1,944	317	416	1	3	6	68	1	10	4,205
United Kingdom	14,840	1,480	851	11,028	5,081	1,039	(5)	2	52	75	52	(5)	34,500
Other Europe	1,758	414	230	1,532	1,077	865	17	15	27	478	20	19	6,452
Total	35,843	3,728	1,647	24,490	13,271	4,163	27	41	190	1,543	108	112	85,163
Asia:													
India	---	6	1	---	---	625	15	(5)	2	31	13	11	704
Japan—Nansei and Nampo Islands	1,057	84	(5)	5,794	5,608	435	7	5	22	1,261	19	407	14,699
Malaya	---	(5)	---	(5)	---	84	16	---	1	---	2	3	106
Philippines	---	7	(5)	(5)	---	293	132	1	14	---	9	13	469

Turkey	-----	140	154	313	(5)	421	-----	-----	1	-----	(5)	17	1, 046
Other Asia	339	276	198	236	706	965	366	1	48	25	33	54	3, 247
Total	1, 396	513	353	6, 343	6, 314	2, 823	536	7	88	1, 317	76	505	20, 271
Africa:													
Belgian Congo	-----	40	1	26	-----	91	86	-----	(5)	-----	(5)	6	250
Egypt	-----	2	-----	-----	-----	256	(5)	-----	(5)	-----	(5)	10	268
French West Africa	-----	60	30	186	17	2	4	-----	-----	-----	(5)	1	300
Union of South Africa	-----	43	(5)	-----	-----	500	127	(5)	38	-----	21	28	757
Other Africa	539	313	221	617	155	299	81	3	1	36	3	24	2, 292
Total	539	458	252	829	172	1, 148	298	3	39	36	24	69	3, 867
Oceania:													
Australia	-----	157	1	10	-----	693	(5)	-----	8	29	9	1	908
French Pacific Islands	-----	29	12	29	21	5	2	1	-----	-----	-----	-----	99
New Zealand	-----	12	2	-----	-----	149	19	2	3	-----	3	-----	190
Other Oceania	-----	-----	1	-----	-----	(5)	(5)	-----	-----	-----	-----	-----	1
Total	-----	198	16	39	21	847	21	3	11	29	12	1	1, 198
Grand total	50, 203	30, 792	4, 914	45, 071	32, 875	13, 193	1, 545	4, 538	1, 023	5, 176	270	1, 032	190, 632
Shipments from continental United States to Territories and possessions:													
Alaska and Hawaii [6]	-----	6, 386	135	2, 868	7, 046	145	187	-----	(7)	50	(7)	16	16, 833
Puerto Rico	(7)	1, 401	243	184	(7)	69	47	(7)	(7)	(7)	(7)	4	1, 948
Wake	(7)	879	-----	20	(7)	(5)	1	(7)	(7)	(7)	(7)	(5)	900
Other	(7)	174	12	81	(7)	4	7	(7)	(7)	(7)	(7)	(5)	278
Total	-----	8, 840	390	3, 153	7, 046	218	242	-----	(7)	50	(7)	20	19, 959
Exports from noncontiguous Territories and possessions to foreign countries:													
Alaska	-----	115	-----	266	-----	(5)	-----	-----	-----	-----	-----	(5)	381
Other	-----	130	47	152	1, 859	2	(5)	12	-----	-----	(5)	-----	2, 202
Total	-----	245	47	418	1, 859	2	(5)	12	-----	-----	(5)	(5)	2, 583
Total net shipments from continental United States	50, 203	39, 387	5, 257	47, 806	38, 062	13, 409	1, 787	4, 526	1, 023	5, 226	270	1, 052	208, 008

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[1] Compiled by Mae B. Price and Elsie D. Jackson, of the Bureau of Mines, from records of the Bureau of the Census, U. S. Department of Commerce.

[2] Country and continent totals exclude but grand totals include: 1956—14,229; 1957—14,538 thousand barrels of aviation gasoline; 1956—4,304; 1957—581 thousand barrels of lubricating oils; and 1956—182; 1957—102 thousand barrels of jet fuel for which country breakdown may not be published for security reasons.

[3] Includes naphtha but excludes benzol (thousand barrels): 1956—65; 1957—64.

[4] Revised figure.

[5] Less than 1,000 barrels.

[6] Figures represent shipments from refining companies to Alaska and Hawaii through Pacific coast ports, as reported to Bureau of Mines by shippers.

[7] Not separately classified.

WORLD PRODUCTION

CRUDE PETROLEUM[2]

World production of crude petroleum in 1957 totaled 6.4 billion barrels, compared with 6.1 billion barrels in 1956.

The principal producing countries in the Free World (United States, Venezuela, Kuwait, Saudi Arabia, Iraq, and Iran) produced 4.8 billion barrels in 1957—75.0 percent of the world output, compared with 76.9 in 1956. Gains in U. S. S. R. and several small producing countries offset an appreciable drop in production in Iraq.

Middle East (Bahrain, Egypt, Iran, Iraq, Israel, Kuwait, Saudi Arabia-Kuwait Neutral Zone, Qatar, Saudi Arabia, and Turkey) production was 1.3 billion barrels—the same quantity reported in 1956. The total was 20.3 percent of world production in 1957, compared with 20.8 percent in 1956.

In the Western Hemisphere the United States produced 2.6 billion barrels, the same quantity as in 1956. Canadian production increased 5.6 percent. Output in Mexico declined 2.7 percent. Venezuela increased production 12.8 percent to 1.0 billion barrels. The gain was due primarily to unusally large exports to Western Europe in the first 3 months of 1957. During that period some Western European countries turned to Venezuela for crude petroleum owing to curtailment of supplies from the Middle East. Brazil, responding to a marked gain in refining capacity, produced 10.1 million barrels of crude petroleum in 1957, almost three times the 1956 production. Argentina increased output by 9.7 percent to reach 34.0 million barrels.

In Western Europe, where production is on a much smaller scale, West Germany continued to lead with an output of 28.7 million barrels, an increase of 13.0 percent. Production in Austria continued to decline, the 1957 output being 22.0 million barrels compared with 23.6 million and 24.9 million barrels in 1956 and 1955, respectively. During 1957 Italy doubled its production to 8.6 million barrels as Gulf Italia intensified its operations in Sicily. Production in France increased 9.6 percent to 10.2 million barrels; approximately 90 percent came from the Parentis field of Esso Standard Oil Co.

Production in eastern Europe (U. S. S. R., Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Rumania, and Yugoslavia) totaled 816.5 million barrels, according to information derived almost entirely from announcements made by Government agencies in that region. Of this total, U. S. S. R. produced 87.9 percent, a slight increase over 1956. Russian output was reported as increasing 17.3 percent to 717.6 million barrels. A sharp decline occurred again in Hungary, which produced 5.1 million barrels, compared with 9.1 million in 1956 and 12.2 million barrels in 1955. Output in Rumania, the largest producer among the satellite countries, was 83.3 million barrels, a gain of 2.3 percent.

The Middle East maintained the output recorded in 1956 despite a serious decline in Iraq production, which was only 163.5 million barrels compared with 232.3 million in 1956. In the early part of

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[2] By J. V. Hightower.

1957 pipeline movements from Iraq to the Mediterranean were still much below normal, pending restoration of movements curtailed by the Suez crisis in Egypt in the last quarter of 1956. Gains by other major producers offset the loss. Iran produced 263.1 million barrels—a gain of 33.5 percent. Kuwait, the leading producer in the Middle East, increased production throughout the year, with the result that output in December was 39.7 percent higher than in January. Although one of the smaller producers in the region, the Saudi Arabia-Kuwait Neutral Zone doubled its output of crude oil. Production in Egypt gained 35.2 percent, reflecting greatly increased output from fields in the Sinai Peninsula.

In Africa, Algerian production continued to drop; the 1957 output was less than half that in 1956. The 1957 statistics apply only to commercial production, all of which went to France. During the year crude oil was produced in the important new Sahara region of Algeria and collected for eventual export to France, but the volume of this noncommercial output is not established. The first shipment reached France early in 1958. The Gabon region of French Equatorial Africa produced crude in commercial quantities for the first time, the output being 1.2 million barrels. Exports to France began in May 1957.

In the Far East (British Borneo, Burma, China (Communist), Formosa (Taiwan), Indonesia, India, Japan, New Guinea, and Pakistan) production increased 13.8 percent to 173.6 million barrels. Indonesia, the principal supplier, produced 114.1 million barrels in 1957, a gain of 21.6 percent over 1956. The bulk of the gain in Indonesia was due to Caltex operations in central Sumatra. India's production increased 12.7 percent. The output of Japan and Pakistan changed little in 1957. Production in New Guinea continued to drop; the 1957 output was only 87.3 percent of that in 1956. Burma doubled production to 2.9 million barrels.

TABLE 83.—World production of crude petroleum, by countries, 1953–57, in thousand barrels [1]

[Compiled by Pearl J. Thompson]

Country	1953	1954	1955	1956	1957 [2]
North America:					
Canada	80,899	96,080	129,440	171,981	181,846
Cuba [3]	17	25	375	543	395
Mexico	72,440	83,653	89,406	90,660	88,266
Trinidad	22,346	23,629	24,896	28,929	34,064
United States	2,357,082	2,314,988	2,484,428	2,617,283	2,616,778
Total	2,532,784	2,518,375	2,728,545	2,909,396	2,921,349
South America:					
Argentina	28,501	29,573	30,501	31,013	33,953
Bolivia	601	1,695	2,693	3,196	3,575
Brazil	916	993	2,022	4,009	10,106
Chile	1,258	1,736	2,577	3,542	4,337
Colombia	39,431	39,981	39,711	44,968	46,782
Ecuador	3,040	3,146	3,599	3,420	3,191
Peru	15,999	17,162	17,242	18,383	19,289
Venezuela	644,243	691,810	787,409	899,212	1,014,457
Total	733,989	786,096	885,754	1,007,743	1,135,690
Europe:					
Albania	994	1,168	1,388	1,868	3,268
Austria	21,860	23,400	24,886	23,622	21,955
Bulgaria	----------	----------	1,103	1,691	2,095
Czechoslovakia	[4] 1,329	[4] 1,100	950	950	950
France	2,555	3,616	6,224	9,100	10,189
Germany, West	15,505	19,008	22,435	25,408	28,698
Hungary	6,455	9,286	12,216	9,172	5,127
Italy	655	535	1,519	4,209	8,593
Netherlands	5,701	6,535	7,126	7,652	10,625
Poland	1,400	1,363	1,334	1,363	1,340
Rumania	67,506	72,600	78,670	81,390	83,327
U. S. S. R. [5]	380,160	426,960	509,760	611,740	717,600
United Kingdom	410	450	408	489	614
Yugoslavia	1,236	1,557	2,027	2,076	2,797
Total [5]	505,766	567,578	670,046	780,730	897,178
Asia:					
Bahrein	10,978	10,992	10,982	11,015	11,691
Burma	1,051	1,345	1,582	1,420	2,958
China [4]	1,500	3,000	3,500	4,700	5,000
India	2,215	2,235	2,526	2,876	3,241
Indonesia	75,626	79,586	87,083	93,820	114,151
Iran	9,400	21,500	120,562	197,148	263,134
Iraq	210,268	228,432	251,206	232,307	163,498
Israel	----------	----------	----------	146	423
Japan	2,101	2,124	2,229	2,169	2,243
Kuwait	314,592	347,319	398,493	399,874	416,045
Kuwait-Neutral Zone	----------	5,995	8,848	11,684	23,259
Pakistan	1,762	1,945	2,068	2,118	2,200
Qatar	31,025	36,450	41,983	45,300	50,798
Sarawak and Brunei	36,848	36,315	39,751	42,983	41,821
Saudi Arabia	308,294	347,845	352,240	360,923	362,121
Taiwan (Formosa)	18	35	24	21	17
Turkey	179	399	1,205	2,213	2,159
Total [5]	1,005,857	1,125,517	1,324,282	1,410,717	1,464,759
Africa:					
Algeria	638	570	438	253	100
Angola	----------	----------	----------	52	1,059
Egypt	16,501	13,774	12,634	11,929	16,157
French Equatorial Africa	----------	----------	----------	----------	1,207
Morocco: Southern Zone	761	881	765	734	566
Total	17,900	15,225	13,837	12,968	19,089
Oceania:					
New Guinea	1,751	4,045	3,413	2,610	2,279
New Zealand	8	7	6	7	6
Total	1,759	4,052	3,419	2,617	2,285
World total (estimate)	4,798,055	5,016,843	5,625,883	6,124,171	6,440,350

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[1] This table incorporates a number of revisions of data published in previous Petroleum chapters.
[2] Preliminary figures.
[3] Natural naphtha and gas oil.
[4] Estimate.
[5] U. S. S. R. in Asia (including Sakhalin) included with U. S. S. R. in Europe.

OIL SHALE[3]

Figures on world production of oil shale by countries appeared last in the Minerals Yearbook for 1938. Since that time annual statistics have been collected by the British Government and published in Statistical Summary of the Mineral Industry, by Her Majesty's Stationery Office, London. The figures in table 84 were obtained from this source.

Beginning in 1944 the Bureau of Mines conducted an extensive research and development program on Colorado oil shale, which has been described in the Annual Reports of the Secretary of the Interior on Synthetic Liquid Fuels.

The development part of this program was terminated in 1955, but research is being continued at Laramie, Wyo. In addition to the Bureau's work on oil shale, the Union Oil Co. of California is operating an experimental retort near Grand Junction, Colo., and experimental work is being carried on at the Denver Research Institute under the sponsorship of The Shale Oil Co., Beverly Hills, Calif. No final reports on the results have been published. Neither company has produced on an industrial scale.

TABLE 84.—World production of oil shale, by countries, 1941–56, in long tons[1]

	1941	1942	1943	1944	1945	1946	1947	1948
Great Britain	1, 631, 843	1, 784, 247	1, 759, 215	1, 609, 363	1, 398, 202	1, 316, 533	1, 110, 817	1, 380, 719
South Africa	81, 213	109, 849	116, 254	112, 527	119, 275	111, 891	165, 816	205, 318
Australia	123, 745	117, 324	116, 875	137, 458	123, 170	121, 654	138, 427	136, 352
Austria	----------	----------	----------	4, 210	4, 546	2, 598	1, 586	1, 122
France	182, 816	191, 241	258, 433	218, 081	222, 248	340, 043	409, 238	436, 465
Italy	48, 729	50, 683	35, 169	9, 822	12, 855	5, 018	3, 158	5
Spain	----------	----------	----------	99, 232	99, 574	106, 129	67, 745	74, 465
Sweden	403, 079	1, 089, 112	1, 649, 984	2, 325, 847	1, 751, 282	1, 843, 937	1, 326, 960	1, 376, 567

	1949	1950	1951	1952	1953	1954	1955	1956
Great Britain	1, 402, 694	1, 452, 287	1, 411, 707	1, 401, 191	1, 385, 665	1, 356, 218	1, 336, 100	1, 053, 835
South Africa	203, 867	212, 613	196, 596	191, 583	276, 296	257, 407	274, 459	256, 942
Australia	120, 956	98, 487	78, 564	21, 661	----------	----------	----------	----------
Austria	894	628	985	753	942	1, 038	841	707
France	487, 249	551, 035	372, 604	338, 040	308, 000	243, 976	214, 000	144, 000
Italy	----------	----------	----------	----------	----------	----------	----------	----------
Spain	73, 321	49, 951	52, 285	156, 111	189, 119	234, 071	486, 669	589, 343
Sweden	1, 235, 787	1, 532, 970	1, 463, 447	1, 630, 271	1, 901, 744	1, 793, 034	1, 829, 070	2, 101, 852

[1] Source: Statistical Summary of the Mineral Industry, published by Her Majesty's Stationery Office, London, 1950–56. Oil shale is also produced in Germany, U. S. S. R., and Manchuria.

PETROLEUM TECHNOLOGY

DRILLING AND PRODUCTION[4]

Each year from 1943 through 1956 discoveries of liquid hydrocarbons have exceeded production. Proved reserves of liquid hydrocarbons found in 1957 were 349 million barrels less than the quantity produced.[5]

Drilling.—Exploratory and development drilling in the United States likewise declined in 1957. A total of 53,350 wells was drilled in 1957, or 8.6 percent less than in 1956. For the first year since 1949, the number of wells drilled failed to exceed those drilled in the preceding year. Exploratory wells drilled in 1957 declined to 11,383, of which 1,202 were successful in finding oil, gas, or condensate. The national average for 20 years shows that 12 percent of the exploratory wells produced successfully, whereas in 1957 only 10.6 percent were successful. New Mexico and South Louisiana, of the more active exploration areas, led the Nation, more than 20 percent of their wildcats being successful.[6]

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[3] By S. Klosky, assistant chief, Branch of Oil Shale, Washington, D. C.

[4] By Paul Biggs, petroleum engineer, Bureau of Mines, Laramie, Wyo.

[5] American Gas Association and American Petroleum Institute, Proved Reserves of Crude Oil, Natural Gas Liquids, and Natural Gas: Vol. 12, 1957, 23 pp.

It is remarkable that the average contract price for drilling was $4.60 a foot, or 15 cents less than in 1956, continuing a 5-year trend of declining contract costs per foot drilled and increasing depths of wells drilled. Better planning and use of equipment, techniques, and mud programs were the prime factors in the lower contract price. Few new rigs were purchased in 1957. The lower contract price is outstanding, considering that increased prices for material and equipment pushed the total cost per foot drilled in 1957 to an all-time high of $14 a foot.[7] Figure 9 shows the number of wells drilled, average depth of the wells, contract price per foot, and total price per foot.

Deeper drilling is a natural result of the constantly diminishing number of shallow areas that have geologic structures favorable for oil and gas accumulation. In drilling 199 wells to 15,000 feet or more in 1957, 15 fields and 45 new sands or extensions of old sands were found.

The footage drilled by air- and gas-drilling methods increased in 1957. Results of research gave promise of controlling flow of water in wells being drilled by air and gas. Continued testing of the Turbodrill showed the down-hole motor to be both powerful and rugged. Conventional bits used with the Turbodrill in hard formations failed to give satisfactory service.

Temporary or emergency storage of water at remote locations has been an expensive item in drilling operations. Collapsible tanks made of Neoprene-coated nylon fabric and having a capacity of 15,000 gallons are a partial answer. When rolled up, these tanks form a bundle 8 feet long and only 2½ feet in diameter, and 7 tanks can be carried on a small truck. Thus, the tanks offer extreme mobility and substantial savings in transportation costs.

Better well completions and more accurate reservoir studies depend upon correctly determining the porosity of oil- and gas-bearing rocks. During 1957 a significant improvement in well-logging methods was development of sonic logging, which shows promise of determining porosity more accurately than the previously used resistivity and radioactive methods.[8]

Production.—Formation fracturing by hydraulic pressure had developed into a common and useful method of well stimulation before 1957; however, most operators have been reluctant to use this method in secondary recovery projects. Experience gained in 1957 shows that, under controlled conditions, fracturing of input and producing wells in waterflood projects can materially boost ultimate recovery.[9]

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[6] World Oil, vol. 146, No. 3, February 15, 1958, pp. 87–194.
Oil and Gas Journal, vol. 56, No. 4, January 27, 1958, pp. 145–252.

[7] The Drilling Contractor, vol. 14, No. 4, June 1958, pp. 100–104.

[8] Doh, C. A., and Alger, R. P., Sonig Logging, a New Petro-Physical Tool: Paper 10140 presented at Rocky Mountain Sec. meeting, Soc. Petrol. Eng., AIME, Denver, Colo., March 1958.

One of the oldest oilfield practices has been the measuring or gaging of the oil in lease tanks by a representative of the pipeline company at the time of purchase. Lease Automatic Custody Transfer (LACT) eliminates manual gaging. General acceptance of LACT is indicated by the number of units that were installed in 1957. The first permanent permit for LACT operation was issued by the Texas Railroad Commission in mid-1957. Economic studies show that on a barrels-of-oil-run-per-day basis new LACT units may now require less investment than conventional equipment.[10]

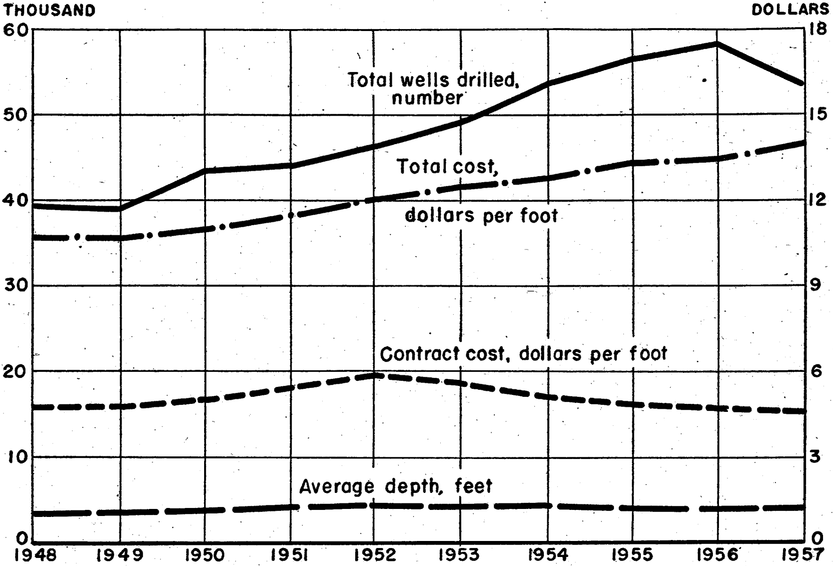

FIGURE 9.—Number of wells drilled, depth, and cost per foot of drilling, 1948–57. (Source: Oil and Gas Journal, January 27, 1958, p. 130.)

The Secondary Recovery and Pressure Maintenance Committee of the Interstate Oil Compact Commission reported at their mid-1958 meeting that economically recoverable secondary-recovery reserves were up 1.1 billion barrels in 1957.[11] Miscible-phase displacement, particularly the use of liquefied petroleum gases followed by gas, received more consideration by the industry in 1957. Pilot or full-scale projects were begun in California, New Mexico, Oklahoma, and Wyoming.[12]

Premature breakthrough or channeling of the injected liquid in some miscible-phase projects shows that precise engineering control of such projects will be required. Experience at the Millican field, Coke County, Tex., indicates that larger proportions of injected liquid may be needed than laboratory studies indicate.[13]

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[9] Oil and Gas Journal, vol. 55, No. 16, April 22, 1957, pp. 118–126.
World Oil, vol. 45, No. 5, October 1957, pp. 205–208.

[10] Oil and Gas Journal, vol. 56, No. 7, February 17, 1958, p. 114.

[11] Petroleum Week, vol. 6, No. 26, June 27, 1958, p. 14.

[12] Oil and Gas Journal, vol. 55, No. 10, March 11, 1957, p. 96; vol. 55, No. 27, July 8, 1957, pp. 74–76; vol. 55, No. 46, November 18, 1957, p. 156.

[13] Oil and Gas Journal, vol. 55, No. 48, December 2, 1957, p. 59.

A process for injecting liquid carbon dioxide as the displacing fluid in a secondary recovery project was scheduled for a full-scale project test in the Bartlesville sand, Bartlesville-Dewey oilfield, Okla.[14]

Thermal recovery by underground combustion of petroleum hydrocarbons continued to be a major laboratory research problem. Several new field tests of this process were announced in 1957. Incomplete reports of these field tests show that the coke or carbonaceous material deposited on the sand grains as the heat wave progresses will be a deciding factor in the success of this type of secondary recovery.[15]

TRANSPORTATION

Construction of pipelines established a record of 19,900 miles in 1957. Gas pipelines amounted to 13,100 miles, crude-oil pipelines, 3,900 miles, and products pipelines 2,900 miles.

There were no revolutionary developments. The trend was definitely toward greater use of automatic controls, permitting more remote control. A positive-displacement meter with a capacity of 10,000 barrels an hour was proved in operation. Tapes and epoxy-coal-tar plastics were widely used for protective coatings.[16]

PROCESSING AND UTILIZATION[17]

Refining.—Installed crude-oil refining capacity increased little during 1957, and actual crude-oil runs decreased slightly.[18] However, refiners continued to expand their supplemental facilities, especially those needed to provide superior-quality gasolines. Installed capacity for catalytic cracking was increased from 3,988 thousand barrels per day in 1956 to 4,246 thousand barrels by the end of 1957. Catalytic reforming capacity was increased from 1,248 to 1,533 thousand barrels per day and alkylation capacity from 273 to 310 thousand barrels per day. Hydrogenation, to upgrade catalytic cracking and reforming feed stocks and to improve finished-product quality, continued to occupy an important place in the refining picture; installed capacity reached approximately 1,343 thousand barrels per day by the end of 1957 compared with 879 thousand barrels per day at the end of 1956.[19] Construction was under way in 1957 on several additional butane-isomerization plants to prepare feed stock for alkylation. Construction also was begun on the first two isomerization units for producing high-octane-number blending stocks directly from pentane and hexane stocks. These plants, scheduled to go on stream in 1958, are at Shreveport, La., and Borger, Tex. Two new isomerization processes designed to handle pentane and hexane were announced during the year. Both of these use noble-metal catalysts.

Isomerization of stocks rich in normal pentane and hexane promises to become an important upgrading tool, both to the refiner faced with the problem of best utilizing his low-boiling-range, straight-run naphthas and to the producer of natural gasoline. Neither material as such is an attractive component (except for volatility adjustment) of today's high-octane motor fuels. Isomerization, however, can increase the octane number of such stocks to desirable levels. To illustrate this potential of isomerization, the following are octane numbers (research octane numbers plus 3 ml. tetraethyl lead per gallon) for normal pentane and hexane and for various isomers of these hydrocarbons: Normal pentane, 88.7; 2-methylbutane, 108.5; normal hexane, 65.3; 2,3-dimethylbutane, 119.1; 2,2-dimethylbutane, 106.0; 2-methylpentane, 93.1; and, 3-methylpentane, 93.4.[20]

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[14] Oil and Gas Journal, vol. 56, No. 16, April 21, 1958, p. 104.

[15] Torrey, Paul D., New Techniques for Improving Oil Recovery: Producers Monthly, vol. 22, No. 3, January 8, 1958, pp. 27–40.

[16] Oil and Gas Journal, vol. 56, No. 4, January 27, 1958, pp. 182–185.

[17] By J. E. Phillips, chemical engineer, Bureau of Mines, Washington, D. C.

[18] See p. 12 and 62.

[19] Oil and Gas Journal, vol. 56, No. 12, March 24, 1958, pp. 88–90.

Continuing a trend of many years, gasoline octane numbers rose to new heights in 1957. In the summer of 1956 the national average research octane numbers of Regular- and Premium-grade gasolines were 88.8 and 96.4, respectively. By the winter of 1957, comparable values were 90.0 and 98.0. Supergrade gasolines, with octane numbers above 100, appeared in a few localities in 1956. By the winter of 1957 gasolines with an average research octane number of 101.1 were available in most sections of the country. Another noticeable trend in the properties of motor gasolines has been a slow rise in Reid vapor pressure. From 1947 to 1957 this increase was about 1 pound for both Premium and Regular grades, which now average about 8.8 and 11.0 pounds for summer and winter blends, respectively.[21]

The nationwide "refinery-pool" gasoline in 1957 was composed by volume-percent of 9 principal ingredients: Catalytically cracked gasoline, 26.8; catalytic reformate, 24.8; straight-run gasoline (200° F. maximum end point), 17.0; natural gasoline, 11.6; thermally cracked gasoline, 7.2; butane, 4.9; catalytic polymer, 3.7; alkylate, 3.0; and, thermal reformate, 1.0. This pool gasoline had a research octane number of about 83 clear and 94 blended with 3.0 ml. of TEL per gallon.[22]

Petrochemicals.[23]—The petrochemical industry claimed less than 2 percent of the petroleum and natural gas produced in 1957. It provided, however, an estimated 25.4 percent by weight (38.7 billion pounds) of the output of the chemical process industries and 55 percent ($4.75 billion) in terms of value.

Ammonia continued to lead the petrochemical field in quantity with an output of approximately 6.7 billion pounds in 1957, of which three-fourths went to the fertilizer market. Most of the hydrogen used in ammonia synthesis came from natural gas by steam reforming and partial oxidation, followed by the shift reaction. Additional hydrogen was derived from refinery gases, particularly catalytic reformer offgases, and by conversion of heavier refinery streams including residuals.

Ethylene maintained its position as the organic petrochemical intermediate with the largest production—4 billion pounds in 1957 compared with 3.5 billion pounds in 1956. About 29 percent went into the manufacture of ethylene oxide, 22 percent into ethyl alcohol, and 17 percent into polyethylene. Most of the remainder was used in producing styrene, ethyl chloride, and ethylene dichloride. Less than half of the ethylene oxide produced in 1957 came from the long-established chlorohydrin process. The newer, direct-oxidation process supplied the balance and continued to gain favor. A potentially important development in direct-oxidation techniques is the use of 95 percent oxygen instead of air as the oxidizing agent. Advantages claimed for the oxygen process are improved yield of ethylene oxide, simpler and more reproducible operation, and less contamination of the silver-bearing catalyst. Two 60-million-pound-a-year plants using the new process were under construction in 1957 at Geismer and Lake Charles, La. (scheduled for operation in mid-1958), and a third plant, with a planned capacity of 50 million pounds per year, was being built at Partington, England.

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[20] Petroleum Refiner, vol. 36, No. 9, September 1957, pp. 215–220. (Octane numbers above 100 are in terms of Wiese formula.)

[21] Blade, O. C., Motor Gasolines, Winter 1957–58: Bureau of Mines Petrol. Products Survey 5, 1958, 33 pp.

[22] Wolfe, C. J., and Cole, C. A., Refining Trends and Antiknock Potential, 1957 to 1962: Preprint Nat. Petrol. Assoc., 55th Semiannual meeting, Cleveland, Ohio, April 15–17, 1958.

[23] Oil and Gas Journal, vol. 56, No. 9, March 3, 1958, pp. 95–99.
The Refining Engineer, vol. 30, No. 1, January 1958, pp. C–11 and C–12.
Petroleum Refiner, vol. 37, No. 1, January 1958, pp. 179–184; vol. 36, No. 11, November 1957, pp. 193–205.
Chemical Week, vol. 81, No. 13, September 28, 1957, pp. 45–59.
Petroleum Processing, vol. 12, No. 9, September 1957, pp. 101–149.

Despite increased octane-number requirements for gasoline in 1957, more high-octane materials from catalytic reformers were diverted from gasoline to chemical use than in earlier years. Production of the principal aromatics derived directly from catalytic reformers—benzene, toluene, and the xylenes—increased from 2.7 billion pounds in 1956 to approximately 2.9 billion pounds in 1957, or slightly more than half of the total supply from all sources. In addition, output of petroleum-derived styrene, made by benzene-ethylene alkylation, increased from 588 million pounds in 1956 to an estimated 612 million pounds in 1957.

Output of most other petrochemical intermediates also increased in 1957 compared with 1956. Noteworthy examples are: Propylene, 1,700 compared with 1,640 million pounds; butylene, 1,950 compared with 1,915 million pounds; and butadiene, 1,500 compared with 1,459 million pounds. Propylene, used principally in manufacturing isopropyl alcohol and cumene, promises to become a rapid-growth petrochemical of the future as the basis of polypropylene plastics and fibers. The first commercial developments in the polypropylene field were begun in 1957 by the Montecatini Company in Italy. Butylene, formerly used largely in producing butadiene-based synthetic rubber, is finding increased use as a feed stock in alkylation plants producing high-octane gasolines. Butadiene, produced to an increasing extent by catalytic dehydrogenation of butane, is used principally in manufacturing GR–S synthetic rubber for automobile tires. The first privately financed and constructed butadiene plant went on stream early in 1957 near Houston, Tex. This plant, with a capacity of 65,000 to 90,000 tons per year of butadiene depending upon other products being made, features a butane catalytic dehydrogenation unit followed by furfural extractive distillation facilities to separate the butadiene from other products, largely butene-1 and butene-2.

Additives.—Little, if any, present-day gasoline is free of additives. In common use are antioxidants, metal deactivators, corrosion inhibitors, anti-icing agents, preignition preventers, dyes, and tetraethyl lead (most prevalent of all) to improve the antiknock value of the fuel. Each additive is designed to impart a desirable quality to the gasoline that is difficult or impossible to attain with usual refining techniques. Thus, additives play an important role in the manufacture of the superior gasolines required for trouble-free operation of modern automotive and aircraft engines.

A noteworthy advance in the field of gasoline additives, announced in mid-1957, is development of a manganese-containing antiknock agent that materially supplements the octane-number improvement in gasoline achieved by adding tetraethyl lead.

Illustrating the potential value of the additive—cyclopentadienyl manganese tricarbonyl—tests with a standard aircraft engine (18-cylinder, turbocompound type) indicated that it permitted increased power output of as much as 20 percent.[24] Subsequent tests with pure hydrocarbon fuels and gasolines of known hydrocarbon content showed that the additive usually is most effective with paraffinic and naphthenic fuels, is moderately effective with olefinic fuels, and has little effect on aromatic fuels. For example, the research octane number of a natural gasoline containing 3 ml. of tetraethyl lead per gallon and 93 percent paraffins and naphthenes was increased 6.8 numbers by using the manganese compound at a concentration of 1 gm. of manganese per gallon of gasoline. Similarly, the octane number increased 2.9 with a regular-base gasoline stock containing 56 percent paraffins and naphthenes, 17 percent olefins, and 27 percent aromatics. With a catalytically reformed gasoline containing 48 percent paraffins, 1 percent olefins, and 51 percent aromatics, the octane number increased only 0.3.[25]

The manganese additive is not yet on the market, pending completion of performance tests and refinement of the manufacturing process. Bureau of Mines thermodynamic studies of a closely related compound are expected to be of material assistance.

Other gasoline additives announced in 1957 include two nonalcoholic, anti-icing agents. One was disclosed to be dimethylformamide.[26] The makeup of the other was not indicated, except that it is not an alcohol.[27] Most other anti-icing additives in general use are alcohols such as isopropanol.

Supplemental Fuels.—The American Gilsonite Co. in August 1957 began to convert gilsonite (a naturally occurring, solid, bituminous material) into premium-quality gasoline, distillate fuel oil, and Electrode-grade coke in a new refinery near Grand Junction, Colo.[28] This plant is the only commercial producer in the United States today of liquid fuels from materials other than crude oil and natural gas. In the mid-1800's, coals and oil shales were being processed by several companies, principally to produce kerosine.[29] With a charge of 700 tons of gilsonite daily, the Grand Junction refinery is designed to yield daily 1,300 barrels of gasoline, 275 tons of calcined coke and some fuel oil that is burned in the plant. The refinery consists essentially of a recycle delayed coking unit, a catalytic reforming plant, and allied fractionation, gas-absorption, and gasoline-stabilization equipment. Auxiliary facilities include feed-preparation equipment, a hydrogen-producing plant, and a calciner to convert the green coke to a finished product containing less than 0.5 weight-percent volatile combustible material and less than 0.25 weight-percent sulfur. The hydrogen facilities are necessary because the quantity of hydrogen produced in the catalytic reforming unit is insufficient for proper operation of the unit. Gilsonite is deficient in hydrogen compared with crude oil. The gilsonite raw material is mined hydraulically from deposits near Bonanza, Utah, that contain at least 16 million tons. The mined material is crushed to minus ¼ inch and transported as a water slurry (about 35 percent gilsonite) in a 6-inch pipeline 72 miles to the refinery site. At the refinery the gilsonite is dried then melted by blending it with hot recycled oil from the coking unit preparatory to charging it to the coking heater.

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[24] Oil and Gas Journal, vol. 55, No. 27, July 8, 1957, p. 84.
[25] Oil and Gas Journal, vol. 56, No. 19, May 12, 1958, pp. 107–111.
[26] The Refining Engineer, vol. 29, No. 12, Nov. 1957, p. C–34a.
[27] Petroleum World and Oil, vol. 54, No. 51, Dec. 19, 1957, p. 7.
[28] Petroleum World and Oil, vol. 54, No. 35, August 29, 1957, pp. 14–30.
[29] Gavin, M. J., Oil Shale, an Historical and Economic Study: Bureau of Mines Bull. 210, 1924, pp. 97–98.

Amoco Chemicals Corp. gas-synthesis plant for manufacturing liquid fuels and chemicals from natural gas and air at Brownsville, Tex., was closed late in 1957. The plant has a history of intermittent development and operation by various companeis, beginning with Carthage Hydrocol, Inc., in 1945. The reason given for the latest shutdown was that the current economics of the process is unattractive, despite solution of the major technical problems of operations.

The principal features of the process comprise partial oxidation of natural gas with oxygen to produce synthesis gas (carbon monoxide and hydrogen), followed by reaction of the synthesis gas in the presence of an iron catalyst to produce liquid fuels and various oxygenated chemicals, such as alcohols, organic acids, aldehydes, and ketones. The plant was designed to produce 6,000 barrels of gasoline, 900 barrels of gas oil, 200 barrels of fuel oil, and 300,000 pounds of chemicals daily from 90 million cubic feet of natural gas and 280 million cubic feet of air.[30]

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[30] Oil and Gas Journal, vol. 55, No. 38, September 23, 1957, p. 84.

C. Helium

Helium

By Q. L. Wilcox and Henry P. Wheeler, Jr.

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GENERAL SUMMARY

THE FOUR HELIUM PLANTS operated by the Bureau of Mines produced a record 291 million cubic feet of helium in 1957. By augmenting the production with 22 million cubic feet of conservation helium withdrawn from underground storage, 313 million cubic feet was made available for distribution, and 310 million cubic feet was shipped.

The supply met all Federal demands for helium, with enough available for non-Federal users to fulfill all defense contracts and medical requirements. Some civilian users did not get all the helium they wanted for less essential purposes.

Additional helium-plant facilities were put into operation at Exell, Tex., in June. The annual production capacity was increased over 150 million cubic feet thereby. Federal demands absorbed the additional helium produced, continuing the tight supply-demand situation.

The Bureau of Mines studied plans to meet anticipated future requirements for helium through adequate production and conservation.

PRODUCTION

The Bureau of Mines has helium plants at Amarillo and Exell, Tex.; at Otis, Kans.; and at Navajo (Shiprock), N. Mex. All 4 plants were operated in 1957 to produce a record 291,457,300 cubic feet of helium; output for 1956 was exceeded by 19.5 percent. Production since 1921, by years, is given in table 1 and totals nearly 2¼ billion cubic feet.

In years past, helium in excess of demands had been conserved by storage underground in the Government-owned Cliffside field (near Amarillo). During the year 21,972,300 cubic feet of helium was withdrawn from Cliffside to help meet demands in 1957, and 103,200 cubic feet was injected, resulting in a net withdrawal of 21,869,100 cubic feet of conservation helium. The total helium available for distribution was 313,326,000 cubic feet.

Expanded production facilities at the Exell plant were put on line June 2, 1957. The plant capacity was increased to 240 million cubic feet per year. The capability of producing an additional 150 million cubic feet annually at the Exell plant made a total helium-production rate of about 1 million cubic feet per day possible for all 4 plants. The company supplying helium-bearing natural gas to the Exell plant extended and revised its field gathering-system to deliver 90 million cubic feet for daily processing. Modification of the old part of the plant was under way, scheduled for midsummer 1958 completion. The modification was designed to add 80 million cubic feet per year to the plant's capacity.

TABLE 1.—Helium production in the United States, 1921–57

Year	Active plants	Production (cubic feet)
1921–January 1929 [1]	Fort Worth, Tex	46,088,800
1929–April 1942	Amarillo, Tex	164,867,100
1943	Amarillo and Exell, Tex.; and Otis, Kans	116,307,400
1944	Amarillo and Exell, Tex.; Otis and Cunningham, Kans.; and Navajo (Shiprock), N. Mex.	126,933,100
1945	Amarillo and Exell, Tex.; and Otis and Cunningham, Kans	94,733,700
1946	Amarillo and Exell, Tex	58,236,400
1947	Exell, Tex	70,297,700
1948	do	63,143,500
1949	do	55,165,500
1950	Amarillo and Exell, Tex	81,394,400
1951	Amarillo and Exell, Tex.; and Otis, Kans	112,009,200
1952	do	144,556,100
1953	Amarillo and Exell, Tex.; Otis, Kans,; and Navajo (Shiprock), N. Mex.	161,086,800
1954	do	190,741,400
1955	do	220,710,600
1956	do	243,879,700
1957	do	291,457,300
Total		[2] 2,241,608,700

[1] No helium was produced at Government helium plants in February or March 1929. The Fort Worth plant was shut down Jan. 10, 1929, and the Amarillo plant was not put into operation until April.

[2] Includes 24,491,000 cubic feet extracted at the Exell plant and injected into the Government-owned Cliffside gasfield for conservation, in excess of that subsequently withdrawn.

The privately owned helium-bearing gas supply for the Navajo plant was endangered by water encroachment. One producing well was the only source of supply. A marked increase in the quantity of water produced by the well was noted in July. At year end the well was delivering about half the volume of gas it had before the water broke in, which cut production at the Navajo plant to about half capacity. The company concerned began to drill a second well on the Hogback structure in late September. A workover was scheduled to attempt to reduce the water and increase the gas at the first well.

Helium-bearing casinghead gas from the Shaffer field was tied in to the Otis plant in early summer. This helped to level off production, which had been declining because of lower helium content gas and a diminishing supply for processing.

SHIPMENTS

The Bureau of Mines shipped 310,365,300 cubic feet of helium in 1957. Of this total, 224,332,100 cubic feet went to Federal agencies and 86,033,200 cubic feet to non-Federal customers. To handle these quantities, 1,078 tank-car, 428 trailer, and 285,996 cylinder shipments were made.

The tank-car fleet was brought to a total of 122 by delivery of 15 additional tank cars in September. (A contract was awarded in the same month for 15 more tank cars to be delivered in July 1958.) Tank-car round-trip time was held to a near minimum. Conversion of carbon dioxide cylinders to helium service for the Navy was continued in 1957. These factors contributed to make record shipments possible.

CONSUMPTION AND USES

Federal agencies took directly about 72 percent of the helium shipped in 1957. It was estimated that over half of the 28 percent shipped to non-Federal customers was used to fulfill Government contracts. So, nearly 90 percent of the helium shipped was directly or indirectly for the benefit of the Federal Government.

Collectively, the defense departments took about 45 percent of all the helium shipped; the Department of the Navy led, followed by the Air Force and Army Departments, in that order. The Atomic Energy Commission was second only to the Navy in the amount of helium received in 1957.

Continually increasing demands by the Federal agencies absorbed the additional output from the expanded Exell Helium Plant. The helium available for commercial use could not be increased materially. It was necessary, therefore, to continue an informal allocation system to assure helium for essential commercial use and for medical purposes. Helium for advertising, toy balloons, and private lighter-than-air craft was not readily available throughout the year.

Helium was used by Federal agencies to fill airships and meteorological balloons, in atomic energy and guided-missile operations, in shielded-arc welding and where controlled atmospheres were required, and in research. Man's most extended venture into space was accomplished in 1957. Using a helium-filled balloon, a man was aloft 32 hours at heights 19 miles above the earth.

Private helium consumption was mainly for shielded-arc welding. Some other uses were for leak detection, titanium and zirconium production and fabrication, transistors, and medical and research purposes.

RESERVES

Helium can be produced in quantity and economically only from helium-bearing natural gases. It occurs as a minor constituent (usually less than 1 percent) of some natural gases in the southwestern part of the United States. Since 1917 a continuous survey has been conducted to determine the helium content of the Nation's natural-gas occurrences. About 1 part of helium in 200,000 also occurs in the earth's atmosphere; small quantities are also present in gases from some mineral springs, volcanoes, and fumeroles.

Government Helium Reserves.—The Government owns or otherwise controls four of the helium-bearing natural-gas deposits, the most important being the Cliffside field in the Texas Panhandle. It is estimated that natural gas containing nearly 2 billion cubic feet of helium can be recovered for processing at the Amarillo (Tex.) plant. Two relatively small deposits—Helium Reserve No. 1, Woodside structure, Utah, and Helium Reserve No. 2, Harley dome, Utah—are on lands of the public domain and have not been exploited.

The Rattlesnake field is under lease to the Government. The two wells in this field were closed in July 1955 when helium-bearing gas became available to the Navajo (N. Mex.) plant from a well on the privately owned Hogback structure. In September remedial work was begun on the wells in the Rattlesnake field to shut off extraneous water and regain gas production, but to the year end it was unsuccessful. It appeared probable that no more gas could be recovered from the Rattlesnake field and that private sources of helium-bearing gas would have to be relied upon to supply the Navajo plant.

Other Sources of Helium-Bearing Natural Gas.—Government owned or controlled, helium-bearing, natural-gas deposits are relatively insignificant compared with those privately owned. They are not adequate to meet anticipated future demands; however, they are the only real future helium resources, as the Government has no control over the helium in privately owned deposits or in the pipelines transporting helium-bearing gas to markets.

At the Exell (Tex.) and Otis (Kans.) plants helium is produced by processing gas from private sources; however, the helium produced at these plants is only a small part of that contained in the total helium-bearing gas being marketed. The Navajo (N. Mex.) plant produces helium from gas that is too low in heating value to be marketable as fuel.

CONSERVATION

The demand for helium required a net withdrawal of 21,869,100 cubic feet of conservation helium from the Cliffside field, leaving 24,491,000 cubic feet in underground storage at the year end. There was a heavy pull on the Government-owned gas supply for the Amarillo plant. It appeared that the Government-controlled Rattlesnake field could no longer be considered to have recoverable helium-bearing gas because of water encroachment. Thus, helium conservation was limited to utilization of helium produced from natural gas at the Exell (Tex.) and Otis (Kans.) plants that otherwise would have gone to fuel markets and to the relatively small amounts of helium preserved in Helium Reserves No. 1 and No. 2 in Utah.

Conservation of the Nation's helium resources requires careful consideration. It is significant that the defense departments and the Atomic Energy Commission are making the heaviest demands. Helium resources are being depleted as demands increase. Indications are that, unless conservation measures are taken soon, it will not be many years before the depleted helium-bearing gasfields cannot supply gas for processing to more than meet the then current demands for helium—no storage conservation will be possible. No new important helium-bearing gasfield has been discovered since 1943.

PRICES

The Helium Act (50 Stat. 885; 50 U. S. C. 161, 163–166) provides that Federal agencies may requisition helium from the Bureau of Mines by paying proportionate shares of the expenses incident to the administration, operation, and maintenance of the Government helium plants and properties. Throughout 1957 the price to Federal agencies was $15.50 per thousand cubic feet.

The price of helium sold by the Bureau of Mines to non-Federal customers was $19.00 per thousand cubic feet. An additional charge of $2.00 per thousand cubic feet was made to cover filling costs when the helium was required in standard-type cylinders. A list of charges and other information concerning the sale of helium by the Bureau of Mines is included in the Code of Federal Regulations (30 C. F. R. 1).

FOREIGN TRADE

Relatively small quantities of helium are exported annually after application to the Secretary of State and the subsequent issuance of a license authorizing such exportation.

TECHNOLOGY

The Bureau of Mines technical staff at Amarillo did research on the design of a unit for simultaneous removal of nitrogen and helium; this work assured that such a unit would perform satisfactorily. Studies were also conducted on a low-cost apparatus to determine Grade A helium purity. Exploratory work was undertaken on the design of a chromatographic instrument for analyzing continuously the natural-gas streams to be processed for helium.

Of a more routine nature were studies of the phase relationships of the helium-nitrogen system. Research was conducted on the compressibility of helium at high pressures. No such data are in the literature. It appears that an empirical equation can be derived for compressibility at high pressures through any temperature range.

The survey of new natural-gas fields in the United States was continued to determine possible new sources of helium. Samples of natural gas from foreign countries were also analyzed for helium content. No helium-bearing gas deposits of any consequence were discovered, and none have been found in the past 15 years.

PART III. APPENDIX

Tables of Measurement

Volumetric measures

	U. S. gallons	Imperial gallons	Cubic feet	Barrels	Cubic centimeters	Liters	Cubic meters
1 U. S. gallon [1]	1	0. 83688	0. 13368	0. 02381	3, 785. 4	3. 7853	0. 0037854
1 imperial gallon [2]	1. 201	1	. 16054	. 028594	4, 546. 04	4. 5460	. 004546
1 cubic foot	7. 4805	6. 22888	1	. 17811	28, 317. 01	28. 316	. 028317
1 barrel [3]	42	34. 972	5. 6146	1	158, 987. 55	158. 98	. 15899
1 cubic centimeter	. 00026417	. 00021996	. 000035314	. 0000062895	1	. 00099997	. 000001
1 liter	. 26418	. 219976	. 035316	. 0062899	1. 000. 027	1	. 001000027
1 cubic meter	264. 17	219. 97	35. 314	6. 2898	1, 000. 000.	999. 97	1

[1] 1 U. S. gallon=the volume occupied by 231 cubic inches.

[2] 1 imperial gallon=the volume occupied by 10 pounds of water at 62° F. when weighed against brass in air at 30″ barometric pressure.

[3] 1 barrel=42 U. S. gallons.

Weight measures

	Pounds	Kilograms	Short or net tons	Metric tons	Long ton
1 pound	1	0. 45359	0. 0005	0. 00045359	0. 00044643
1 short or net hundredweight	100. 0	45. 359	. 05	. 04536	. 04464
1 gross or long hundredweight	112. 0	50. 802	. 056	. 05080	. 05
1 kilogram	2. 2046	1	. 0011023	. 001	. 0009842
1 short or net ton	2, 000	907. 185	1	. 90718	. 89286
1 metric ton	2, 204. 6	1, 000	1. 1023	1	. 98421
1 long ton	2, 240	1, 016. 06	1. 12	1. 01606	1

NOTE.—1 English water ton=the volume occupied by 1 long ton of water at 60° F.

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